Conversation on RHIOs
Colorado HIMSS
September 29, 2005

RHIO Overview

- Context
- National landscape
- Physician’s- the last mile of connectivity
- Case studies
- Architectures and technologies
- Business model principles
- Related thoughts
Context

US Health System Context 2005

- U.S. health care is a very large and inefficient information enterprise — it still operates mostly with paper ¹
  - $1.7 Trillion in annual spend
  - May be the largest information enterprise
  - Efficiency gains from other industries has yet to be fully deployed
  - EMR, in some form, now in only 20-25% of hospitals and 10-15% of physicians' offices

- Health care system retains dispersed business models
  - A "vast cottage industry" ²

- Predominantly Fee for Service

- Premium increases threatening global competitiveness
  - Employee cost sharing increasing

- Uninsured driving ED utilization increases

¹ Rand Study Richard Hinterlad, Ph.D.,
² Serial Transformation of American Medicine, Ernst
Clinical IT Transformation ROI

Cumulative Savings of $5.2–$12.2 Trillion over 15 Years

1.5% annual productivity improvement from IT (like retail industry)

Official CMS projection of healthcare cost growth

4% annual productivity improvement from IT (1/2 of telecom industry increase)

Annual health expenditures (trillions)

Year


Rand Study Richard Hiltlstedt, Ph.D., RAND

Pioneering Health Care Automation

Bottom Line from Rand

- At 90% adoption, potential EMR-S-enabled savings high (~$77B/yr health care efficiency savings)

- Costs are modest relative to savings (~$10B/yr)

- Potential health and safety benefits also large and could double the savings

- Government should act now

Rand Study Richard Hiltlstedt, Ph.D., RAND

Pioneering Health Care Automation
Industry comparison - retail vs. health

Other Industries
- Champion firm
- Integrated system
- IT-labor substitution
- IT a competitive weapon
- Deregulation
- Standards
- High IT investment
- Market forces
- Consumer involvement
- IT-enabled process change and transformation

Health Care Industry
- No
- Very disaggregate system
- Limited
- Not yet
- No
- Not in place
- Low (H)IT investment
- Market failure
- No consumer involvement
- Some IT-enabled process change

Walker National Interoperability Study

- Direct cost to build national HIT system = $276B
  - 10 year investment

- Return = $613B
  - Same 10 year period
  - 5% of projected total health system spend

- $ 94B per year after initial 10 years

Source: Jan Walker, The Value of Health Care Information Exchange and Interoperability; Health Affairs 1/05
Why Is this Different from CHINs in the 90’s?

Technology
- Internet, health care IT adoption, lower costs (ASP)

Market
- IOM and quality reports, pay for performance
- Federal support from President’s office
- Costs have continued to increase (employer are not competitive globally)

Promise of IDNs and Managed Care
- IDN’s formed in mid-90’s to offer cradle to grave care (e.g. a longitudinal record)
- IDN’s bought health plans to respond to capitation and incent care protocols around clinical data to AVOID unnecessary tests, admission, errors
- But business models are in competitive change, capitation has waned
- Still a fractured system of care. . . .

People and physicians
- Older, sicker. . . . Paying MORE out of pocket (rx, outpatient visits)
- Personal Internet use (empowerment)
- Paperwork, chart management creates inefficiencies, physician pain
- Reimbursement growth flattened. . . . not likely to change

Three Types of Electronic Health Record

Provider/Institutional Electronic Health Record
- CPOE, ePrescribing, used in multiple venues of care, administrative management, billing, reporting, etc.

Population Electronic Health Record
- Serves a geography and/or health system network
- Ties into a national infrastructure
- Derives summary record derived from multiple sources
- Serves the population
- Enables biohealth, public health, outcomes management

Personal Health Record
- Personal health status
National Landscape

RHIOs are Endorsed...

"Forming RHIOs within the next year is the number one thing that people can do today."
— David Brailer, iHealthbeat Interview, Jan. 27, 2005

- What is a RHIO?
  - Collaborative entities that facilitate development, implementation and application of secure health information exchange across care settings

- RHIO's provide Information to
  - Improve care, Save lives
  - Reduce cost
  - Create medical knowledge
  - Protect our citizens

No Federal guidelines at this point, evolution of the concept will continue with the latest round of RFPs
ONCHIT July 2004 Framework for Action

- Inform Clinical Practice
  - Incentivize EHR Adoption
  - Reduce Risk
  - Diffuse into Rural and Underserved Areas

- Interconnect Physicians
  - Regional Collaborations
  - NHIN

- Personalize Care
  - Encourage Use of Personal Health Records

- Improve Population Health
  - Unify Public Health Surveillance Architectures
  - Streamline Quality and Health Status Monitoring
  - Accelerate Evidence-based Care

Source: ONCHIT

ONCHIT Initiatives

1) Develop and Evaluate Feasibility of Industrywide IT Standards

2) Develop, Prototypes and Evaluate Compliance Certification Process for EHRs

3) Assess Organization-level Policies and State Laws including HIPAA

4) Six Contracts or Development and Design of Architectures of Internet-based NHIN Prototype

Source: ONCHIT
Other Federal Policy Drivers

- 9 Bills in Congress
- Secretary Leavitt's Advisory Group
- 100+ RHIO grants
- DOQ-IT
- CMQ Pay for Performance
- Interoperability
- Pilot Sites
- State Initiatives
- Banking Metaphor - Visa
- Braier's Initiatives

Federal support of healthcare IT initiatives:
- Funding
- Data sharing and standards
- Multiple stakeholder collaboration,
- Interoperability

Clinical Data Sharing Initiatives Emerging

100-300 Projects as of September 2005

Source: Cerner analysis
Physicians - The Last Mile of Connectivity

Only 15% of physician practices have EMRs

- 500,000 physicians actively practice in an office setting
  - 800,000 physicians in the US
  - 80% are in groups <10 physicians; 50% <5 physicians

- Physicians use of IT includes:
  - Practice management: Highly penetrated; 7+ year buying cycles
  - EMR: 5-10% penetration
    - 40% “kicking tires”
    - Most are large clinics 50+
  - Consumer connectivity is growing, but still small
    - Portals, disease management, secure e-mail
  - E-prescribing is emerging
    - Handheld PDAs, web application standalones
    - Payers, labs

Sources: AMA 2004, TEFH 2003, Cerner analysis.
What data do physicians want from the community?

From Hospitals
- Lab results
- Imaging reports
- Medication, immunz. history
- Allergies
- Problem list
- Procedure history
- Advance directive information
- Discharge summary
- Admission H&P
- Operation reports
- ED reports
- Outpatient therapy summaries
- Other/nice to have
  - Historic patient data as above

Other community sources
- Reference labs
  - Results
- Outpatient Imaging Centers
  - Report
- Pharmacy sources
  - Medication history; formulary
  - Ability to e-transmit prescriptions and receive refill requests electronically
- Other ancillary
  - Meds from nursing homes, home health
- Physicians
  - Referral letter with pertinent data
- Patients
  - Demographics
  - Limited history, problem summary
  - Medication history
  - Allergies
  - Procedure history
  - Disease management metrics

Source: Phil Smith, MD; Loren Hauck, MD: Adventist Health System

Continuity of Care Record (CCR)

Conceptual Model of the CCR

| Document Identifying Information | Optional Extension
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From/Po info re Provider/Clinician</td>
<td>Referral/Transfer</td>
</tr>
<tr>
<td>Patient Identifying Information</td>
<td>Optional Extension</td>
</tr>
<tr>
<td>Insurance and Financial Info</td>
<td>Extension</td>
</tr>
<tr>
<td>Extension → Eligibility, Co-payment, etc.</td>
<td></td>
</tr>
<tr>
<td>Health Status of Patient</td>
<td>Extension</td>
</tr>
<tr>
<td>Extension → Med. Specialty-specific Info</td>
<td></td>
</tr>
<tr>
<td>Extension → Disease Management-specific Info</td>
<td></td>
</tr>
<tr>
<td>Extension → Personal Health Record Info Documented by the Patient</td>
<td></td>
</tr>
<tr>
<td>Care Documentation</td>
<td>Extension</td>
</tr>
<tr>
<td>Extension → Med. Specialty-specific Info</td>
<td></td>
</tr>
<tr>
<td>Extension → Disease Management-specific Info</td>
<td></td>
</tr>
<tr>
<td>Extension → Institution-specific information</td>
<td></td>
</tr>
<tr>
<td>Extension → Care Documentation for Payers (Attachments)</td>
<td></td>
</tr>
<tr>
<td>Extension → Personal Health Record Info Documented by the Patient</td>
<td></td>
</tr>
<tr>
<td>Care Plan Recommendation</td>
<td>Extension</td>
</tr>
</tbody>
</table>

Mandated Core Elements of the CCR

Source: AAFP
What is the value for a physician?

- Single view of from multiple sources
- Patient centric data
- Point of care clinical decisions
- Complements physician office workflow
- Access controls and security meets HIPAA
- Help desk and support
- Health maintenance alerts
- Control patient costs for pharma
- Data on medication compliance

Source: Cerner analysis

What is the cost for a physician?

- Free...
  - Funded by health plan, hospitals, grants to get it up and running
    - Healthbridge, Indianapolis, CareScience, others

- Whatcom County, WA- $71/month for eRx
  - After the solution was proven to be valuable and reliable (3 years)
  - Can’t charge doctors for an idea...

- A full office EMR at $500 per physician per month

- Can create a business model at these price points...

Source: Cerner analysis
RHIO Case Studies

Indiana Health Information Exchange (HIE)

Centralized Model Lead by Regenstrief

- Physician Offices
- Payers
- Ambulatory & Surgery Centers
- Hospitals
- Labs
- Public Health
- Physician Practices

HIE Data Repository
### Indiana Health Information Exchange

<table>
<thead>
<tr>
<th>Board</th>
<th>Funds</th>
<th>Goals</th>
<th>Services</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 hospitals, 5 systems; non-profit; began 1997</td>
<td>State, city, eHi grant; federal grants; user fees ('05); Hospitals put in $1M upfront; $0 from docs; $1.5M/yr for ops</td>
<td>Sharing data to improve quality, safety, efficiency, research; be a national example</td>
<td>Clinical messaging</td>
<td>Started with ED doc access to hospital data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Result distribution: lab, path, rad, ED, transcription</td>
<td>Report distribution via e-mail, fax or print</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Web portal to view results</td>
<td>Messaging (e-mail network)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Research</td>
<td>Help desk</td>
</tr>
</tbody>
</table>

**Observations**
- One of the oldest and most successful RHIOs
- Hospital funding (w/ROI) and grants funded start-up and time
- Started small, high value for physicians (ED-clinical data)
- Clinical data repository model (Regenstrief)
- Got hospital leadership and physician input from the start

Sources: CIO 3/05; ihie.com; interview with Mark Overtage, MD; Cerner data

### Santa Barbara Care Data Exchange

**Community Model with local data management...**

![Diagram of Santa Barbara Care Data Exchange]

**Guiding Principles...**
- Program management office govern operations & build the CDE
- 10 Health Organizations with 4 clusters (alliances)
- Each alliance has autonomy with some central governance / standards
  - Exchange Council
  - Alliances (4)
  - Tech advisory committee
  - Clinical advisory committee
Santa Barbara Care Data Exchange

<table>
<thead>
<tr>
<th>Board</th>
<th>Funds</th>
<th>Goals</th>
<th>Services</th>
<th># hosp/docs</th>
<th>6 key physician benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>501(c)(3); 10 organizations grouped in 4 alliances around &quot;information trading partners&quot;</td>
<td>$10M grant from California Health Foundation in 1996; $400k federal grant in 2004</td>
<td>Is it doable?</td>
<td>Doc portal</td>
<td>2 hospitals 2 doc groups Medical Public health Medical society Ref lab VA</td>
<td>Data from multiple sources Patient centric At point of care Access at different locations Improve office workflow Data access needs to be monitored</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Is it financially sustainable?</td>
<td>Consumer portal</td>
<td></td>
<td>Security</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can it improve quality of care?</td>
<td>EMPI Data locator service (clinical index)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observations

- Closely affiliated with Braiker's company CareScience (acquired by Quovadx in '03)
- Core technology of peer to peer sharing "medical google"
- Go live delayed from 2002 to 2005 which allowed docs to lose interest

Source: DG USD; Cerner Data California Health Care Foundation

Colorado Initiative - Potential Partners

Source: David Kaplan, MD; Matt Madison, Art Davidson, MD; eHI presentation 3/05

Pioneering Health Care Automation
Massachusetts Initiatives

- Massachusetts eHealth Collaborative (MeHC)
  Facilitator of the last mile connection (micro-community)
- Northern Berkshire Medical Center (Funded)
- Berkshires and MAHC (Funded)
- MA SHARE (The business that operates the technology grid per community)

- Massachusetts Health Data Consortium
  The converting incubator for eHealth organization

- Safe Health Info: Fallon Clinic, FCHP, and UMass Memorial

Massachusetts Technology Collaborative
Facilitator of computerized provider order entry

Sources: Slide from UMass School of Medicine

HealthBridge

HealthBridge

Web Portal

- Clinical Messaging
- Results
- Email & MD Directory
- Eligibility & Pre-Cert

Middleware

- Hospitals
- Payers
- Nursing Homes

Physicians

Pioneering Health Care Automation
## HealthBridge

### Board
- Parent org. is the Greater Cincinnati Health Council
- Non-profit founded in 1997
- Governed by 5 health systems' CIOs, MDs, and community Orgs

### Funds
- Seed capital & monthly dues ($166k monthly) from health systems
- CDC $259k grant
- Proctor & Gamble
- Cincinnati Bell infrastructure
- Access fees paid by billing & transcription services providers

### Goals
- Improve the quality and efficiency of healthcare through a shared networking infrastructure
- Clinical messaging
- Physician portal to review results
- Eligibility checking & Pre-certification
- Email and MD directory

### Services
- 25 hospitals
- 235 practices
- 4,000 MDs
- 3 Health Plans

### Participants
- Free connectivity to HealthBridge for physicians
- Help desk 24/7
- Community wide licensing program
- Physicians have access to clinical and insurance info from 5 health systems and Humana

### Benefits


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**Announcements**

- Health Alliance
- Children's Hospital
- Trinity Health
- Drake Center
- St Elizabeth
- Hospital System Access Form
- Hospital System Guides

**IMPORTANT IN**

- LastWord
- AccessANT+InSite
- L/H MagicWeb
- SLE MagicWeb
- SLVH MagicWeb
- Lab Reference Manual

**If you have questions please contact HealthBridge, 513-459-7222**

**News Releases**

- [The Health Alliance Radiology Results Now Available](#)
- [Medicare converts to PinyaMed](#)
- [Cincinnati MedLab Joms HealthBridge](#)

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**HealthBridge Portal Homepage**

- Home
- Physicians Directory
- Clinical Messaging
- Hospital Systems
- Insurance
- Medical Reference
- E-Commerce
- HealthBridge Info

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**Pioneering Health Care Automation**

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**Cerner**
CalRHIO...

- **Mission**: A collaborative, statewide initiative to improve quality & efficiency of health care through use of IT

- **Components Include...**
  - Project Office (HealthTech)
  - Working Committees
  - Web site
  - Communication Program

- **Major Funders...**
  - Sutter - $1M
  - Calif HealthCare Foundation - $450K
  - Kaiser - $1M
  - WellPoint Foundation - $1M
  - Univ of California - $100K

- **2005 Projects...**
  - Link Hospital EDs
  - Infrastructure
  - Meds Management
  - Administrative Functions
  - Personal Health Records

- **Goals**
  - Incrementally build a statewide data exchange
  - Implement projects that build exchange systems
  - Build financial and business models
  - Ensure CA’s exchanges meet national architecture
  - Support policy development
  - Identify legislation

RHIO Case Study Observations
National Landscape - Case Study Summary

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<tbody>
<tr>
<td>501(c)(3) Core</td>
<td>Grants</td>
<td>Share data to improve access and quality</td>
<td>Doc portal</td>
<td>Single view of data from multiple sources</td>
</tr>
<tr>
<td>Hospitals</td>
<td>Hospital capital</td>
<td>Prove viability</td>
<td>Consumer portal</td>
<td>Patient centric data</td>
</tr>
<tr>
<td>Physicians</td>
<td>Payers</td>
<td>Physician connectivity</td>
<td>EMPI</td>
<td>Data at point of care/clinic decision</td>
</tr>
<tr>
<td>Also</td>
<td>Physician user funds only after proven; &lt;$100/mo</td>
<td></td>
<td>Data locator service (clinical index)</td>
<td>Ubiquitous access</td>
</tr>
<tr>
<td>Payers</td>
<td>Business models vary</td>
<td>Security</td>
<td>E-Rx</td>
<td>Complements physician office workflow</td>
</tr>
<tr>
<td>Public health</td>
<td></td>
<td>Messaging</td>
<td>Reporting</td>
<td>Access &amp; security that meet HIPAA</td>
</tr>
<tr>
<td>Labs</td>
<td></td>
<td>Distribution</td>
<td></td>
<td>Help desk/support</td>
</tr>
</tbody>
</table>

Source: Cerner analysis, HealthBridge, Santa Barbara, Indiana Health Information Exchange, Tennessee Medicaid program, CalRHIO, Oregon HIN, VA collaboratives, California Healthcare Foundation.

Challenges for RHIOs...

- Securing upfront funding
- Achieving sustainability
- Complying with and maintaining the standards
- Engaging payers
- Accurately exchanging patient data
- Authenticating and securing patient data
- Addressing the infrastructure and IT platform needs
- Engaging labs and pharmacies
Architecture(s) and Technologies

RHIO Architecture

Health Care Providers  Lab  Consumer  Purchasers  Gov’t, Employer, Insurance, Self

Governance  Health Information Exchange  Public Health

PHR  EHR  MPI  PROV  Document
RHIO architecture

National Landscape - Technology Summary

- Web based
- Clinical Data Repository
- EMPI
- EDI transactions
- Interfaces
- Functionality
  - Results review
  - Report distribution
  - Clinical messaging
  - E-prescribing
  - Health maintenance/disease management
Emerging RHIO Competitive Landscape

- Many consultants and solution pieces
  - Largely undifferentiated
  - FCG, Accenture, CSC, IBM

- Few proof points
  - Our client MHIN is an example

- Key competitors
  - **Product:** Axolotl, Healthvision, efisheshare, CareScience, Wellogic, Oceana
  - **Consultant:** HealthAlliant, CSC
  - **Integrators:** Lockheed Martin, Fujitsu
  - **Payers** (Simbu, WorldDoc)
  - **Reference Labs** (Quest)
  - **Homegrown:** Cincinnati, Indiana

Source: Cerner analysis

Business Model Considerations
Governance

- Hospitals, primary care physicians, health plans, employers

Role of Stakeholders in Governance: All Respondents

Developing a Sustainable Business Model

- Entire community participates
- Begin with a few functions
- Grants can start a sustainable model
- Revenues from fees or transactions
- Other
  - Prudent resource management
  - May be profit or non-profit
  - Develop business plan
  - Assess market

eHI’s High Priority Functions

- Electronic Referral Management
- Electronic Prescribing
- Electronic Lab Results
- Electronic Imaging
- Electronic Disease Management
- Electronic Medication and Reconciliation Management
- Continuity of Care Data Exchanges
- Electronic Quality Data Submission
- Secure Patient/Physician Email
- Electronic Billing (claims, eligibility, Remittance
- Electronic Signature
- Clinical Guideline Prompts
- Results Review
- Outbreak Surveillance
- Clinical Trials Support

Source: 2005 eHI survey on RHIOs

Pioneering Health Care Automation
**Long-term business model goals**

- Subscriber subscription fees?
- Up front capital sources?
- Ongoing operational support?

*Source: 2005 eHi survey on RHIOs*

**Financial Model**

- **Start-up capital**
  - What is the initial expense?
    - Make vs. outsource (hosting, space, FTEs, etc)
  - Would all entities fund the same amount?
  - What are break-even ranges (cost, time)?

- **Revenue sources to explore**
  - User fees (vs. proven solution valuable to users)
  - Access fees for other community health data sources to connect
  - Grants- private, federal
  - State funds
  - Employers

- **Operating Expenses**
  - Technology- hardware, hosting
  - Training-
  - Operations- (in-kind using MSO or other local functions?)
Related thoughts

Other Emerging RHIO(ish) ideas

**KatrinaHealth**

- [Katrinahealth.org](#)
  - Medication history and prescriptions for evacuees
  - To evacuees' medication and dosage information in order to renew prescriptions, prescribe new medications, and coordinate care
  - This information will be accessible from anywhere in the country

"I am interested in a solution that moves patients from high cost care settings (ED) to lower cost care settings (clinics)"
- David Bradshaw, Memorial Hermann, CIO, Houston
"One of the limitations is cultural resistance.... Invariably each industry says, "Our business is different." Within the industry each company says, "We're different." And in each company managers are different. Of course there are real differences, but with respect to management ... they're identical."

Joseph Juran
Drivers for a RHIO Initiative...

- Inefficiencies experienced by the providers
- Physician demand for EMR
- Rising healthcare costs
- Opportunity to reduce meds spend with Medicaid and Medicare
- National IT platform and attention
- Availability of grant funding
- Demand for performance from employers, payers and some consumers
- Public health: surveillance, reporting
Some Observations from RHIOs

- **Where are the high volume transactions?** ("trading markets")
  - Prescription refills: physician to pharmacies (SureScripts) – clear ROIs
  - Hospital report access: physician to hospitals

- **A complete RHIO = providers, consumers, BUYERs (payers)**
  - But, don’t have to wait for everyone to get along...
  - Indianapolis has success with providers
  - Aren’t hospitals also employers?

- **Physician connectivity is the hardest part**
  - Value in the context of the physician at the point of care (eRx, labs, chart review, emergent data access)
  - Is a full EMR required? (vs. eRx, results/report view, messaging)

- **Knowledge has been gained from early adopters**
  - Indianapolis, HealthBridge, Santa Barbara, Michiana Health Information Network

Massachusetts Timeline

- **Mass Health Data Consortium**
  - Formed in 1978
  - Trusted agent that collects, reviews & disseminates healthcare information
  - 34 board members representing healthcare payors, providers and patients
  - Funded by membership dues

- **Mass eHealth Collaborative**
  - Formed in 2004 by Governor Mitt Romney
  - Physician driven initiative to accelerate EHR adoption among physicians
  - 34 board members representing healthcare payors, providers and patients
  - MHDC & MTC are 2 of 14 board members on MAeHC’s executive committee
  - Funded by $15M BCBS contribution

- **Mass Technology Collaborative**
  - Formed in 1982
  - Support the state’s innovation economy by acting as a catalyst between the private sector, govt. and academia
  - 30 board members
  - State funded

- **MA-SHARE**
  - Formed in 2003 by MHDC
  - Promote the inter-organizational exchange of healthcare data
  - 22 members of advisory committee
  - Reporting to MHDC
  - Funded by subscriptions, member dues & grants from BCBS & HRSA

Sources: mhealthdata.org; maehc.org; mipc.org