The Value of Healthcare Information Exchange and Interoperability

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CITL Mission

- Produce timely, rigorous, market-driven assessments which:
  - Help providers invest wisely
  - Help IT firms understand the value proposition
  - Help public shape health policy
- “How do we assess the array of IT options in healthcare, and determine the benefits they bring to patient care and the bottom line?”
CITL Support

- **Major supporters**
  - Partners HealthCare
  - HIMSS

- **Foundations**
  - California Healthcare Foundation
  - Robert Wood Johnson Foundation
  - eHealth Initiative

- **Corporate sponsors**
  - Cap Gemini Ernst & Young
  - Eclipsys
  - IDX
  - Intersystems
  - Misys
  - Siemens
Today’s Agenda

- What are the approaches to Healthcare Information Exchange and Interoperability (HIEI)?
- What would HIEI cost?
- What would be its benefits?
- What is its bottom line value?
Scope of HIEI Assessment

- US health care system is too complex to model. CITL focused on data from doctor-patient encounter:
  - Providers (hospitals, outpatient offices) & common care partners
  - Includes clinical & administrative data

Excluded:
- Secondary transactions
- Transactions within organizations (Internal Integration)
Analytic Approach

- Literature review
  - > 600 citations reviewed: academic, general
  - Evidence of clinical, financial, organizational value

- Expert panel
  - Leaders of local data sharing initiatives, transaction experts
  - General approach & review, estimated HIEI impact

- Cost-benefit software model
HIEI Expert Panelists

- **David Brailer, MD, PhD**
  - Santa Barbara County Care Data Exchange, Health Technology Center
- **William Braithwaite, MD, PhD**
  - Independent consultant, “Dr HIPAA”
- **Paul Carpenter, MD**
  - Associate Professor of Medicine, Endocrinology-Metabolism and Health Informatics Research, Mayo Clinic
- **Daniel Friedman, PhD**
  - Independent public health consultant
- **Robert Miller, PhD**
  - Associate Professor of Health Economics, UCSF
- **Arnold Milstein, MD, MPH**
  - Pacific Business Group on Health, Mercer Consulting, Leapfrog Group
- **J Marc Overhage, MD, PhD**
  - Regenstrief Institute, Associate Professor of Medicine, Indiana University
- **Scott Young, MD**
  - Senior Clinical Advisor, Office of Clinical Standards and Quality, CMS
- **Kepa Zubeldia, MD**
  - President and CEO, Claredi Corporation
## HIEI Taxonomy

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Non-electronic data</td>
<td>No PC/information technology</td>
</tr>
<tr>
<td>2</td>
<td>Machine-transportable data data</td>
<td>Fax/Email</td>
</tr>
<tr>
<td>3</td>
<td>Machine-organizable data</td>
<td>Structured messages, non-standard content/data</td>
</tr>
<tr>
<td>4</td>
<td>Machine-interpretable data</td>
<td>Structured messages, standardized content/data</td>
</tr>
</tbody>
</table>
How Many Interfaces?

**Level 3**
- Provider (Small Group Practice)
- Public Health
- Radiology Centers
- Other Provider
- Labs

**Level 4**
- Provider (Small Group Practice)
- Public Health
- Radiology Centers
- Other Provider
- Labs
- Pharmacies
Provider-Lab HIEI

- **Benefits**
  - Improve clinician access to longitudinal test results
  - Eliminate errors from reporting results verbally
  - Make cost information available, optimize ordering
  - Improve convenience for patients
  - Reduce redundant tests
  - Save time ordering tests, sending and receiving results

- **Evidence re current rate of redundancy, time cost**
  - Experts estimated HIEI impact
Provider–Lab Annual Benefit

13.6% from avoided tests
86.4% from time savings
$31.8B national benefit at Level 4
$118,000 per MD in free-standing office at Level 4
Provider–Radiology HIEI

Benefits

- Improve patient safety and optimize ordering by giving radiologist access to relevant clinical information
- Reduce errors of omission with automated reminders for follow-up studies
- Reduce environmental impact
- Reduce redundant tests
- Save time ordering tests, sending and receiving results/images

Evidence re current rate of redundancy, time cost

Experts estimated HIEI impact
Provider–Radiology Annual Benefit

35% from avoided tests
65% from saved time
$26B national benefit at Level 4
$60,000 per MD in free-standing office at Level 4
Provider–Pharmacy HIEI

Benefits

- Improve patient safety: access to complete medication lists will reduce drug interactions and adverse drug events
- More convenient for clinicians: automatic refill alerts, access to adherence information, automated insurance forms, identify patients for drug recalls
- Efficient formulary management between pharmacies and payers – probably biggest financial impact
- Save time ordering, dispensing prescriptions

Evidence re time and phone calls:

- 55% of prescriptions involve a phone call
- Each call = 2 provider minutes + 3 pharmacist minutes

Experts estimated HIEI impact on % calls
Provider–Pharmacy Annual Benefit

$2.7B national benefit at Level 4

$4,700 per MD in free-standing office at Level 4

Probably most benefit from pharmacy-payer HIEI
Provider–Provider HIEI

Benefits

- Reduce fragmentation
- Reduce educated guesses in clinical care
- Improve referral quality by making relevant information available to the consultant
- Save time responding to referrals
- Save time responding to chart requests

Evidence re referral rates, % visits missing information, administrative costs of referrals and chart requests

Experts estimated HIEI impact on administrative costs
Provider–Provider Annual Benefit

National Benefit:
- Level 2: $2.8 billion
- Level 3: $8.1 billion
- Level 4: $13.2 billion

$43,000 per office MD

- $0
- $500,000
- $1,000,000
- $1,500,000
- $2,000,000
- $2,500,000
- $3,000,000
- $3,500,000

Small Group
Medium Group
Large Group
Small Hospital
Medium Hospital
Large Hospital
Jumbo Hospital

Level 2
Level 3
Level 4
Provider–Public Health HIEI

Benefits

- Earlier recognition of disease outbreaks
- Biosurveillance: identify warning signs by aggregating data from many sources
- Increase % of disease reported
- Save time reporting vital statistics and disease

Evidence re number of vital statistics and disease reports, and time required

- Experts estimated HIEI impact
Provider–Public Health Annual Benefit

$195 million national benefit
Provider–Payer HIEI

Benefits
  
  Save time
  
  Reduce rejected claims

Evidence re % of transactions already automated due to HIPAA

Calculated impact of full automation at Level 4
  
  Levels 2-3 not allowed by HIPAA
Provider–Payer Annual Benefit

$20.1B national net benefit
$10.3B to providers
$9.8B to payers

Level 4

in billions

Medicaid
Medicare
Commercial
Providers
HIEI Cost Model

- Interfaces in each relationship
- Internal systems for providers

Other internal systems:
- Radiology, payers, laboratories, pharmacies already partially automated, hard to get proprietary cost data
- Complex public health system, no cost data available
# HIEI National Value

Value = Benefit - Cost

<table>
<thead>
<tr>
<th>Level</th>
<th>Value during 10-year Implementation</th>
<th>Value per year after Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2</td>
<td>$141 B</td>
<td>$22 B</td>
</tr>
<tr>
<td>Level 3</td>
<td>-$34 B</td>
<td>$24 B</td>
</tr>
<tr>
<td>Level 4</td>
<td>$337 B</td>
<td>$78 B</td>
</tr>
</tbody>
</table>

Value of HIE standards is the difference between Level 3 & 4
10-Year Cumulative Value

Years

in billions

Level 1
Level 2
Level 3
Level 4

0 1 2 3 4 5 6 7 8 9 10

$0

$(200)

$(100)

$0

$100

$200

$300

$400
Steady-State Annual Value

Total: $78 billion

Providers: $34 billion

Level 4
Conclusions

- National implementation of HIEI is a good investment.
- Standardized Level 4 HIEI is by far the best investment for the nation and for individual providers, and probably for labs, radiology centers, payers, and the public health system.
- Non-standardized HIEI is not a good investment.
  - Interfaces are expensive
  - We will have to do it twice
- We must set standards
Limitations

- **Benefits are incomplete**
  - No accounting for transactions beyond our scope
  - No evidence re clinical benefit

- **Costs are incomplete**
  - Could not account for costs of HIEI-capable systems in pharmacies, labs, radiology, public health
  - Interface, provider system costs may be inaccurate
  - Did not estimate cost of converting legacy data, workflow re-engineering
  - Did not estimate cost of developing standards essential for Level 4

- **Time savings may be realized as quality improvements rather than financial returns**
“Unless interoperability is achieved, physicians will still defer IT investments, potential clinical and economic benefits won’t be realized, and we will not move closer to badly needed healthcare reform in the US.”
David Brailer, press conference May 21, 2004
Thank You!

Order report  www.himss.org
More information  www.citl.org

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## HIEI Cost

<table>
<thead>
<tr>
<th></th>
<th>Level 3 Rollout</th>
<th>Level 4 Rollout</th>
<th>Level 3 Annual</th>
<th>Level 4 Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office systems</td>
<td>$162.9 B</td>
<td>$27.1 B</td>
<td>$9.1 B</td>
<td>$1.6 B</td>
</tr>
<tr>
<td>Hospital systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office and hospital interfaces</td>
<td>$123.9 B</td>
<td>$75.7 B</td>
<td>$9.0 B</td>
<td>$5.4 B</td>
</tr>
<tr>
<td>Stakeholder interfaces</td>
<td>$6.4 B</td>
<td>$9.9 B</td>
<td>$0.5 B</td>
<td>$0.5 B</td>
</tr>
<tr>
<td>Total</td>
<td>$320 B</td>
<td>$276 B</td>
<td>$20.2 B</td>
<td>$16.5 B</td>
</tr>
</tbody>
</table>
HIEI Level 4 Value during Implementation

Year: 1 2 3 4 5 6 7 8 9 10

5-year technology rollout period

- Benefit
- Cost

in billions

$120 $100 $80 $60 $40 $20 $0 $(20) $(40) $(60) $(80) $(100) $(120)