



# The Value of Healthcare Information Exchange and Interoperability

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**C!TL**

# Overview

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- Philosophical Orientations on ROI
- Perspectives on IT Value
  - EHR – Electronic Health Records
  - HIEI – Healthcare Information Exchange and Interoperability
- Discussion, Q&A

# Philosophical Orientations for Value Assessment

- OLD: Myopic Views
  - CPR as business requirement – infrastructure
    - ROI on infrastructure is the same as ROI on business process itself
  - CPR as optional business tool subject to ROI analysis
    - ROI on every component of a CPR system, every step of the way
- NEW: Non-Myopic Views
  - CPR in each local implementation a *pre-requisite* to achieving *network effects*, the benefit of wiring healthcare as a whole

# How Does EMR Improve Clinical Outcomes?

- Streamline, structure order process
- Ensure completeness, correctness
- Perform drug interaction checks
- Supply patient data
- Calculate and adjust doses based upon age, weight, renal function
- Charge display
- Redundant test reminders
- Structured ordering with counter-detailing
- Consequent or corollary orders
- Indication-based ordering
- Reduced transcription costs
- Reduced chart pulls
- Improved clinical messaging and workflow
- Improved charge capture and accounts receivable
- Improved referral coordination
- Improved patient communication and service

# How does healthcare information exchange impact the bottom line?

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- Largely, TBD
- Expected effects
  - Reduced healthcare information management labor costs
  - Reduced duplicative tests and procedures
  - Reduced fraud and abuse
  - Improved service delivery efficiency
  - Improved patient convenience
  - Reduced medical error

# CITL Research Team

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- Julia Adler-Milstein, BA
- David W. Bates, MD, MSc
- Doug Johnston, MA
- Blackford Middleton, MD, MPH, MSc
- Eric Pan, MD, MSc
- Ellen Rosenblatt, BS
- Jan Walker, RN, MBA

# Two CITL Analyses of EHR Value

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- The Value of Ambulatory Computerized Provider Order Entry (ACPOE)
- The Value of Healthcare Information Exchange and Interoperability (HIEI)

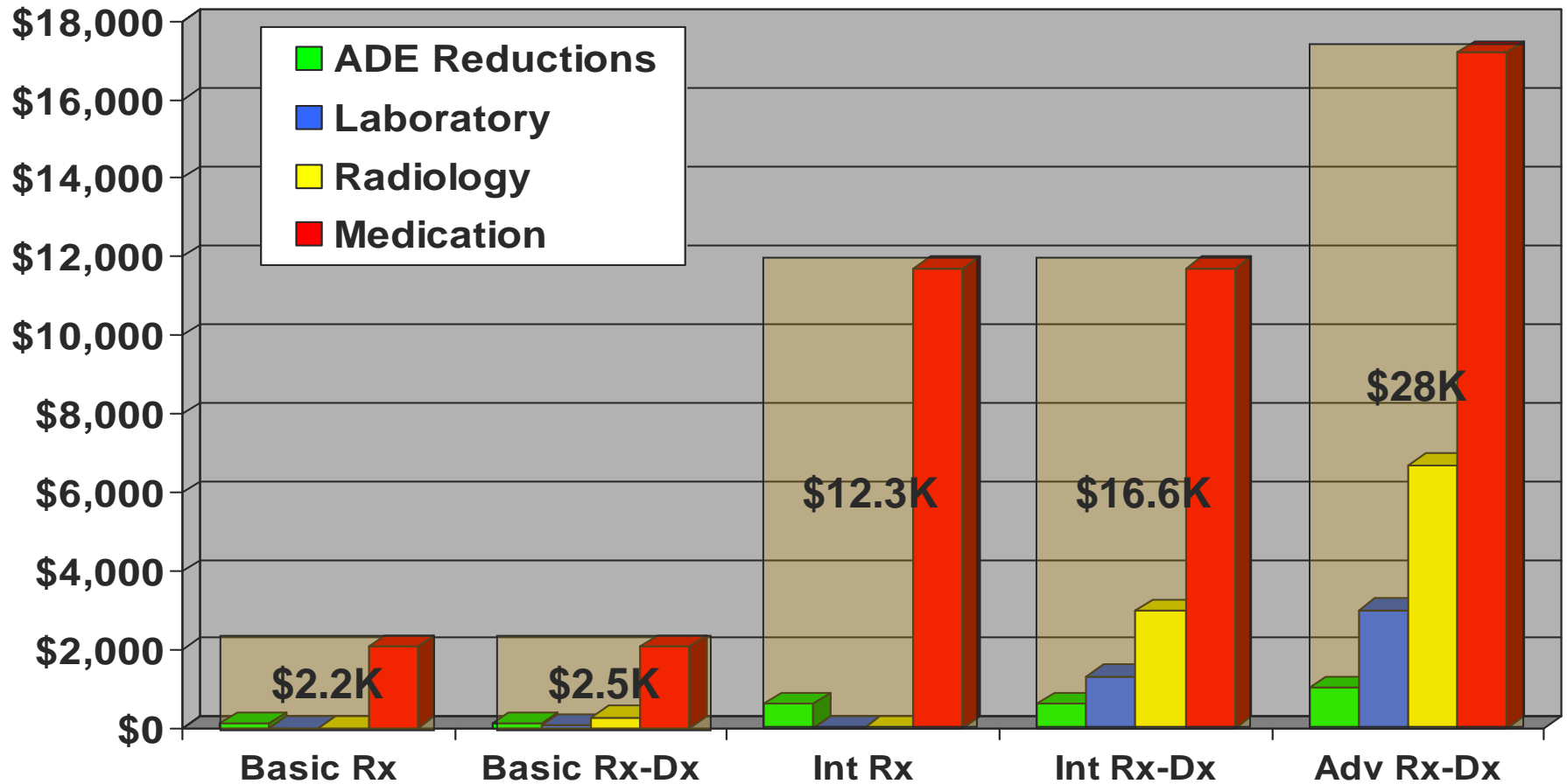
# Clinical Impact of ACPOE

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- Per “average” provider, Advanced ACPOE systems would prevent...
  - 9 ADE/yr
  - 6 ADE visit/yr
  - 4 ADE admission/5yr
  - 3 life-threatening ADE/5yr



# Per “Average” Provider Annual Cost Saving Projections



# Advanced Systems Produce Superior Returns

For example, Advanced ACPOE costs nearly 4x as much as Basic, but...

- Generates over 12x more financial returns
- Produces nearly ten-fold greater reduction in number of ADEs
- Provides IT infrastructure for core clinical computing – the outpatient EMR – which produces additional benefits, and requisite for HIEI
- Pays for itself within first two years

# US Healthcare System Will Benefit

- National adoption of Advanced ACPOE systems would prevent...
  - 2 million ADE/yr
  - 190,000 ADE admission/yr
  - 130,000 life-threatening ADE/yr
- Nationwide implementation of advanced ACPOE could:
  - Save the US \$44 billion annually

# HIEI Motivation

- **Medical error, patient safety, and quality issues**
  - 98,000 deaths related to medical error
  - 40% of outpatient prescriptions unnecessary
  - Patients receive only 54.9% of recommended care
- **Fractured healthcare delivery system**
  - Medicare beneficiaries see 1.3 – 13.8 unique providers annually, on average 6.4 different providers/yr
  - Patient's multiple records do not interoperate
- **Providers have incomplete knowledge of their patients**
  - 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.
- **An 'unwired' system**
  - 90% of the 30B healthcare transactions in the US every year are conducted via mail, fax, or phone

# 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  
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- **Daniel Friedman, PhD**  
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President and CEO, Claredi  
Corporation

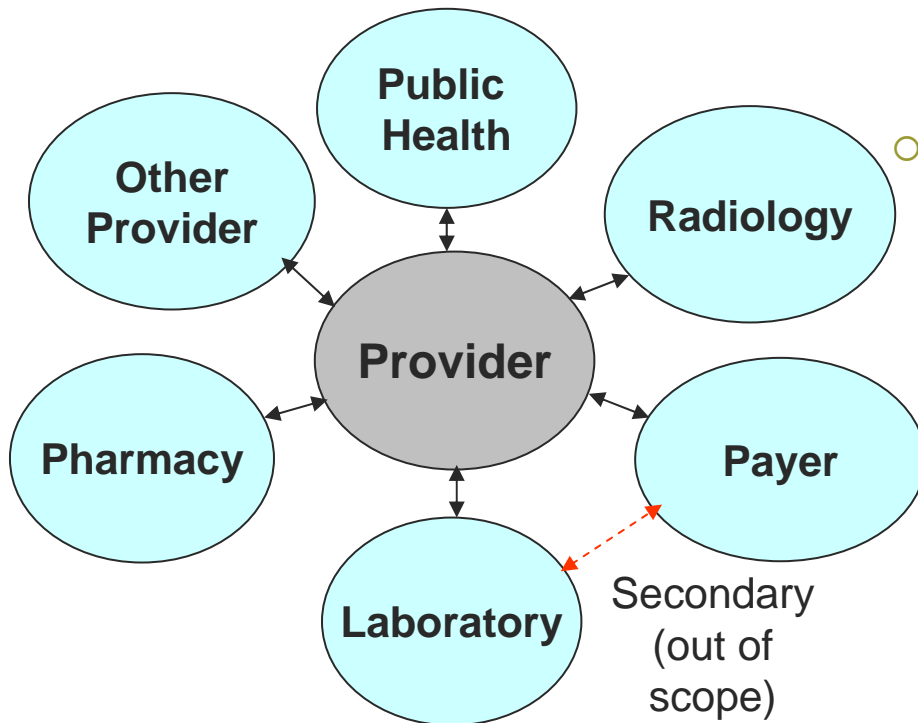
# Value of HIEI: Key Findings

- Standardized, encoded, electronic healthcare information exchange would:
  - Save the US healthcare system \$337B over a 10-year implementation period, and \$78B in each year thereafter
  - Total provider net benefit from all connections is \$34B
  - Net benefits to other stakeholders:

-Payers \$22B	-Pharmacies \$1B
-Laboratories \$13B	-Public Health \$0.1B
-Radiology centers \$8B	
- Dramatically reduce the *administrative burden* associated with manual data exchange
- Decrease unnecessary utilization of *duplicative* laboratory and radiology tests

# HIEI Definition

- Provider-centric encounter-based model of clinical information exchange



- Clinical and administrative transactions and data exchange
  - Between providers and other providers
  - Between providers and labs, pharmacies, payers, radiology centers, and public health departments

# Flow of Healthcare Information

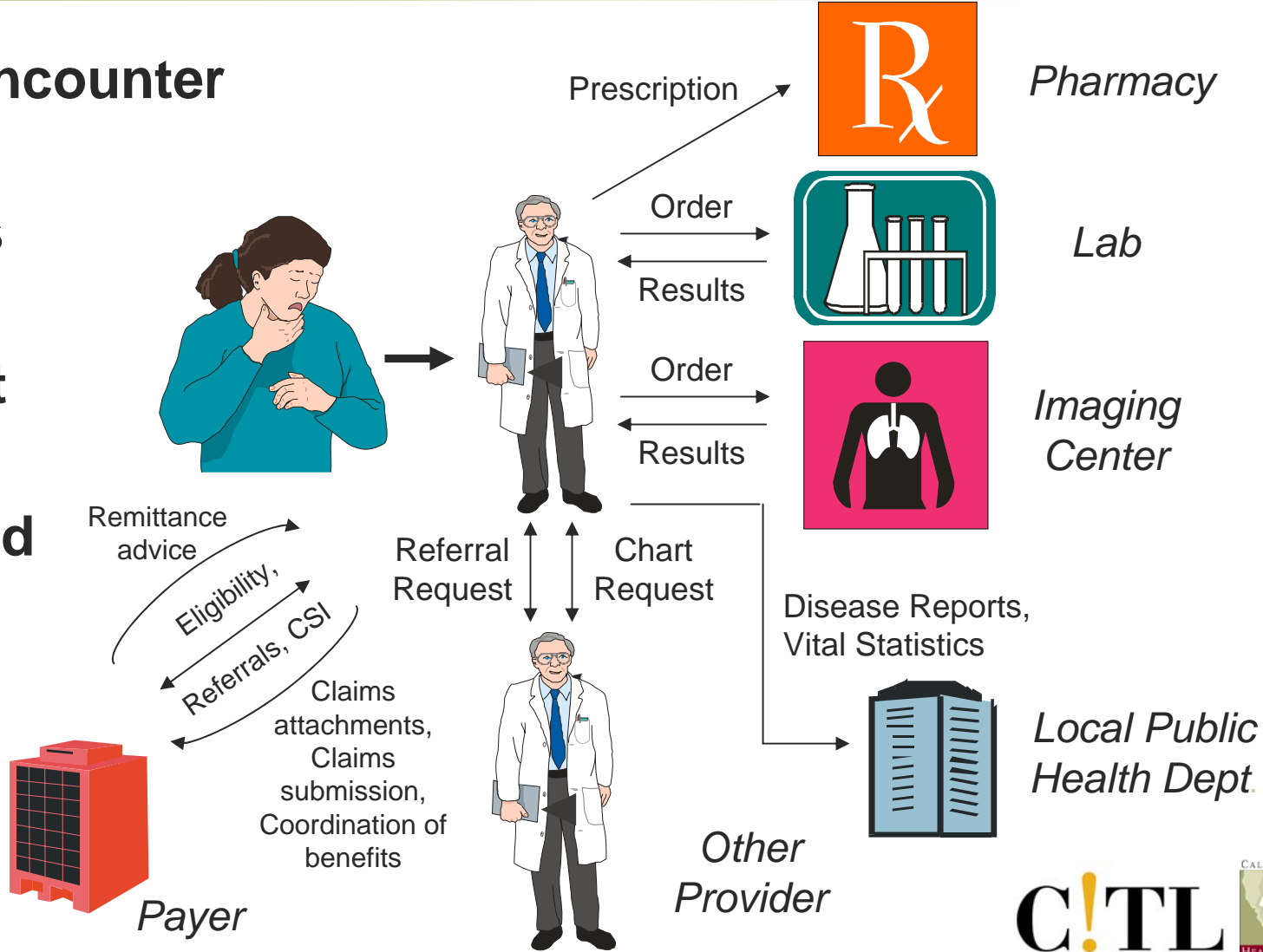
**Clinical Encounter**

**Diagnosis**

**Treatment**

**Claims and Billing**

**Public Health**



*Pharmacy*

*Lab*

*Imaging Center*

*Local Public Health Dept.*

*Other Provider*

*Payer*



# HIEI Taxonomy

Level	Description	Examples
1	Non-electronic data	No PC/information technology
2	Machine-transportable data	Fax/Email
3	Machine-organizable data	Structured messages, non-standard content/data
4	Machine-interpretable data	Structured messages, standardized content/data

# HIEI Cost

	10 yr Rollout		Annual Thereafter	
	Level 3	Level 4	Level 3	Level 4
<b>Office systems</b>	\$162.9 B		\$9.1 B	
<b>Hospital systems</b>	\$27.1 B		\$1.6 B	
<b>Office and hospital interfaces</b>	\$123.9 B	\$75.7 B	\$9.0 B	\$5.4 B
<b>Stakeholder interfaces</b>	\$6.4 B	\$9.9 B	\$0.5 B	\$0.5 B
<b>Total</b>	<b>\$320 B</b>	<b>\$276 B</b>	<b>\$20.2 B</b>	<b>\$16.5 B</b>

# National Implementation Schedule

- Assume a 10-year technology rollout and usage schedule
- Ramp up the adoption of systems and interfaces over the first five years, with 20% adoption per year
- Ramp up the benefit from technology over five years, beginning with 50% benefit in the first year of adoption and increasing by 10% each year
- On a national basis, the return is then realized as follows:

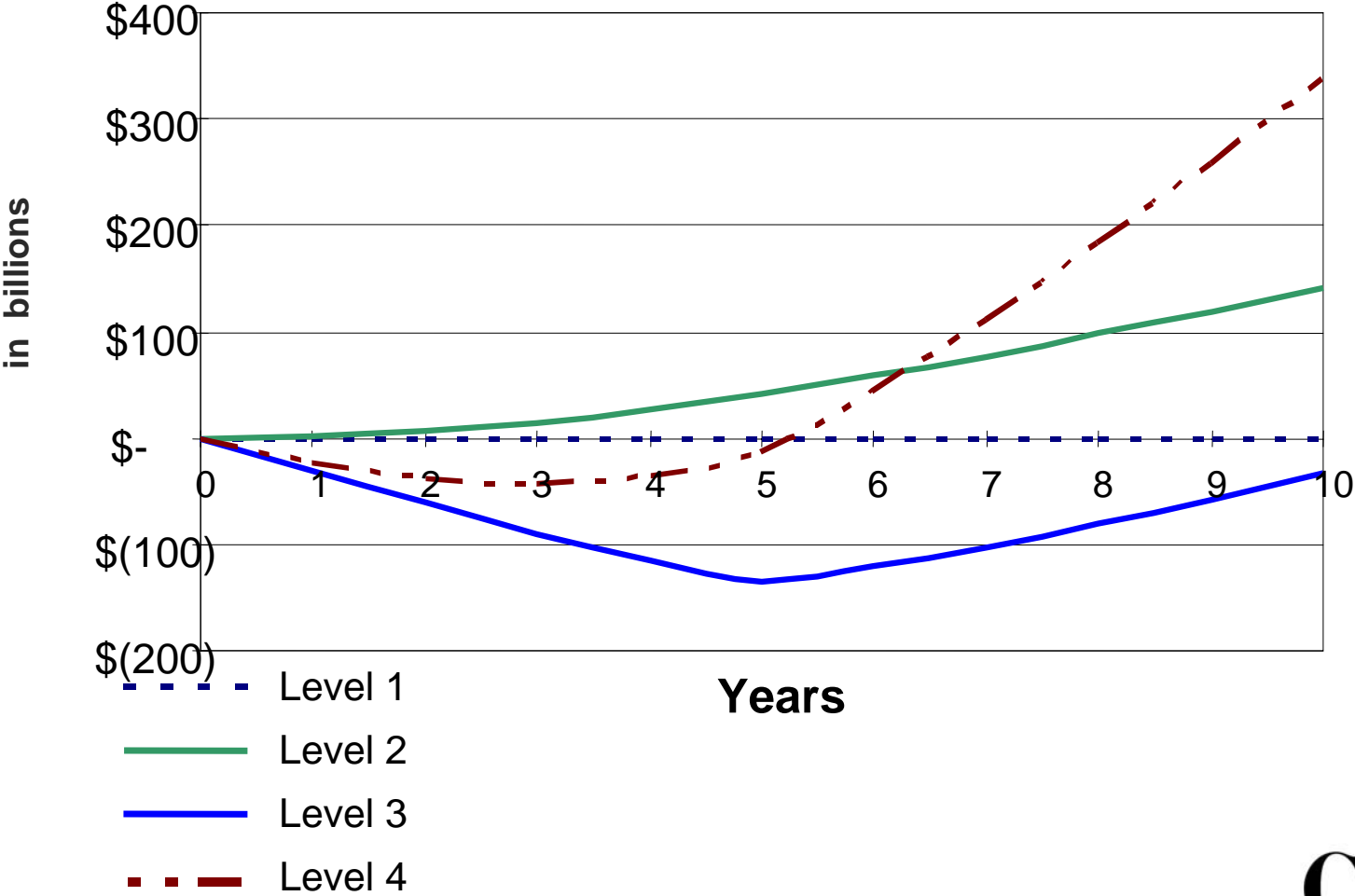
Year	1	2	3	4	5	6	7	8	9	10
Percent of potential return realized	10%	22%	36%	52%	70%	80%	88%	94%	98%	100%

# HIEI National Net Cost–Benefit

	<u>Net Return over 10-year Implementation</u>	<u>Annual Net Return after Implementation</u>
<b>Level 2</b>	\$141B	\$22B
<b>Level 3</b>	-\$34B	\$24B
<b>Level 4</b>	\$337B	\$78B

*Value of HIE standards is the difference between Level 3 & 4*

# 10-Year Cumulative Net Return by HIEI Level



# US Would Benefit from Healthcare Information Exchange

- Nationwide implementation of standardized healthcare information exchange would:
  - Save \$337B over 10 years
  - Save the US \$78B annually at steady state
  - Cumulative breakeven during year five of implementation
- There is a business case for standardized healthcare information exchange and interoperability

# Limitations

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- Our model combines evidence from the academic literature, experts, and market data
- We extrapolate to make national projections
- The model may be incomplete and important determinants missing

# Limitations

- Benefit from secondary transactions beyond provider-centric, encounter-based model not included
- Secondary benefit from enhanced data integration not included
- Costs not included:
  - Stakeholder system cost (other than Providers and Hospitals)
  - Cost to develop, implement, and maintain standards
  - Volume discount associated with a national roll-out
  - Revenue loss to labs and radiology from reduction in tests
  - Conversion of legacy data



# For More Information

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- See [www.citl.org](http://www.citl.org)
- CITL Value of ACPOE Full Report
  - Available from [www.CITL.org](http://www.CITL.org) and [www.HIMSS.org](http://www.HIMSS.org)
- The Value of Healthcare Information Exchange and Interoperability Full Report
  - Available now for pre-order through [www.HIMSS.org](http://www.HIMSS.org)

# Conclusions

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- ROI analyses of ACPOE suggest
  - \$28K savings per provider
  - 12x greater ROI with advanced systems
  - Basic ACPOE systems do not produce positive returns
- Value of Healthcare Information Exchange
  - A 'wired' system could save an *additional* \$78B year

# Summary

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- “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.”
  - Dr. David Brailer, press conference May 21, 2004



Thank you!

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