The Utopian Dream of the All-Knowing Clinician

NHIN, RHIO,PHR, and ???

Eric Pan, MD, MSc

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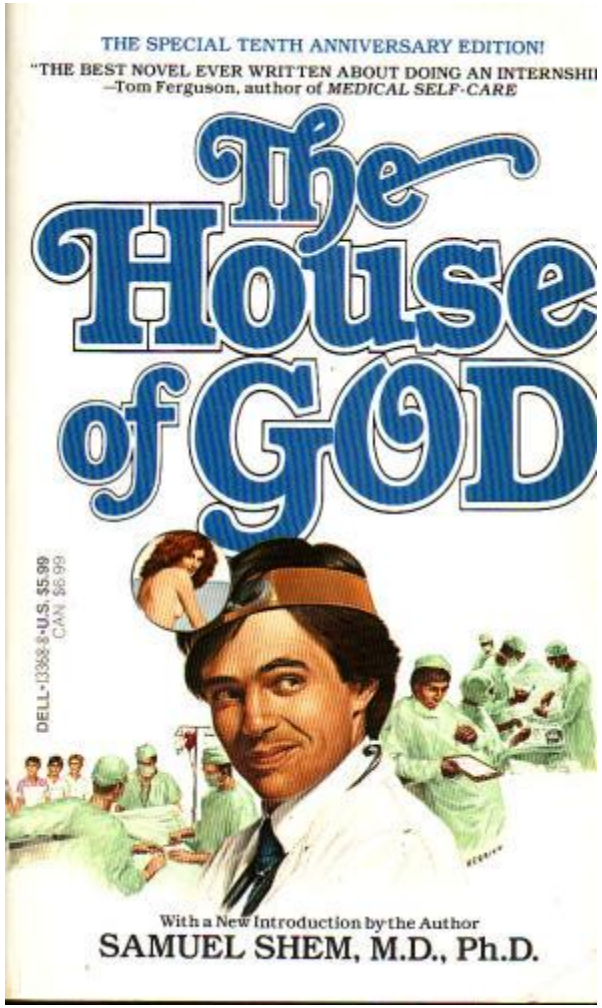
The All-Knowing Clinician???



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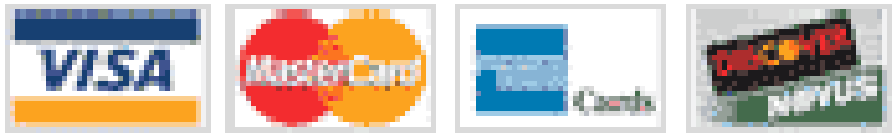
The All-Consuming Database



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The Medical (Informatics) Side

- “Let’s bring everything to the clinician!”
- At the point of care?
- At the point of decision-making?
- Organized?
- Everything?*
- Everything Organized???*

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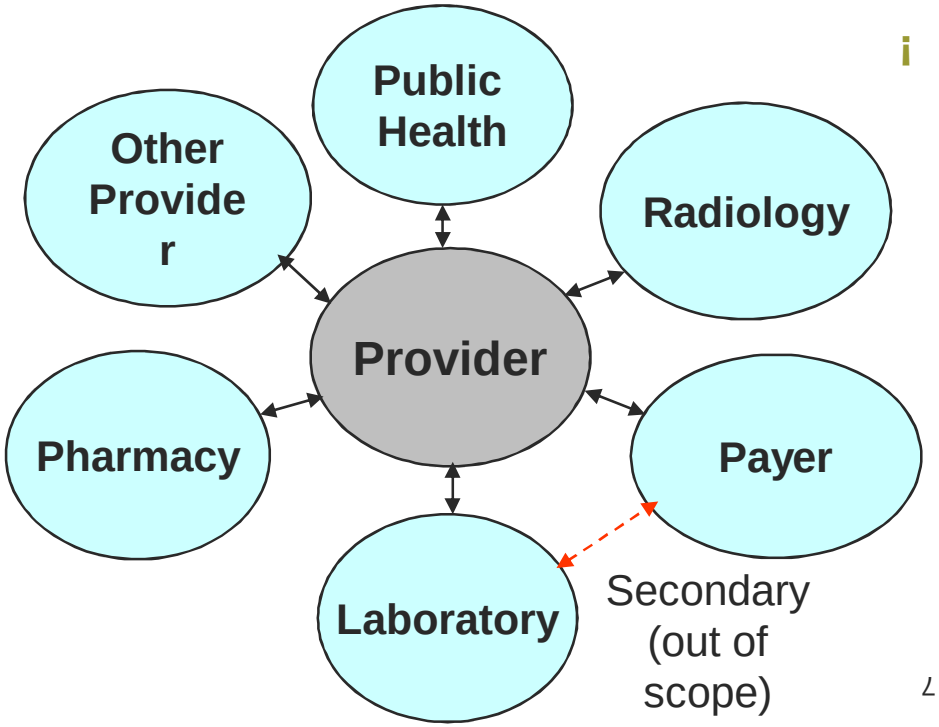
CITL Approach

- Convene an Advisory Board
- Literature Review
- Taxonomy Development
- Evidence Synthesis
- Model Development

CITL's Interoperability Analysis

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

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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

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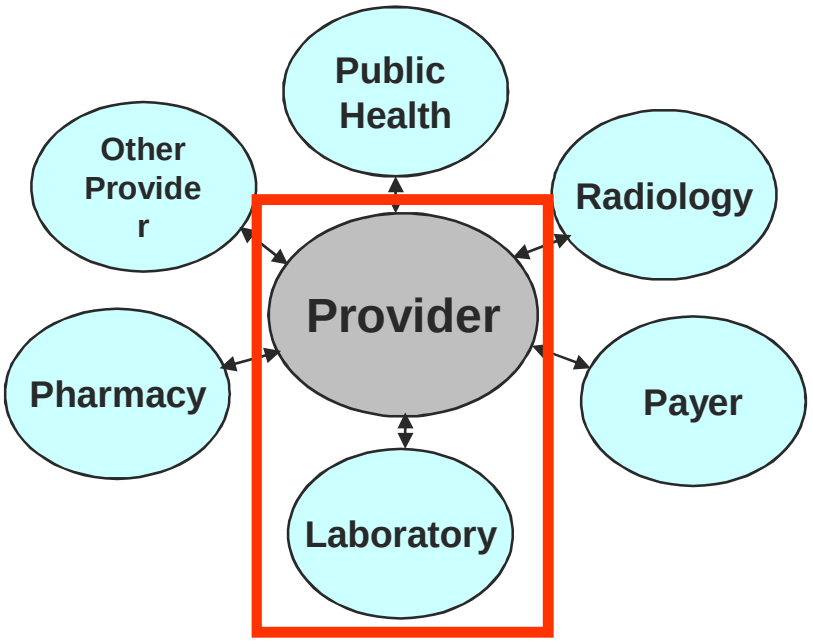
Principal Cost Model Components

- For providers:
  - Number of interfaces
  - Interface costs
  - System costs
- For stakeholders:
  - Number of interfaces
  - Interface costs



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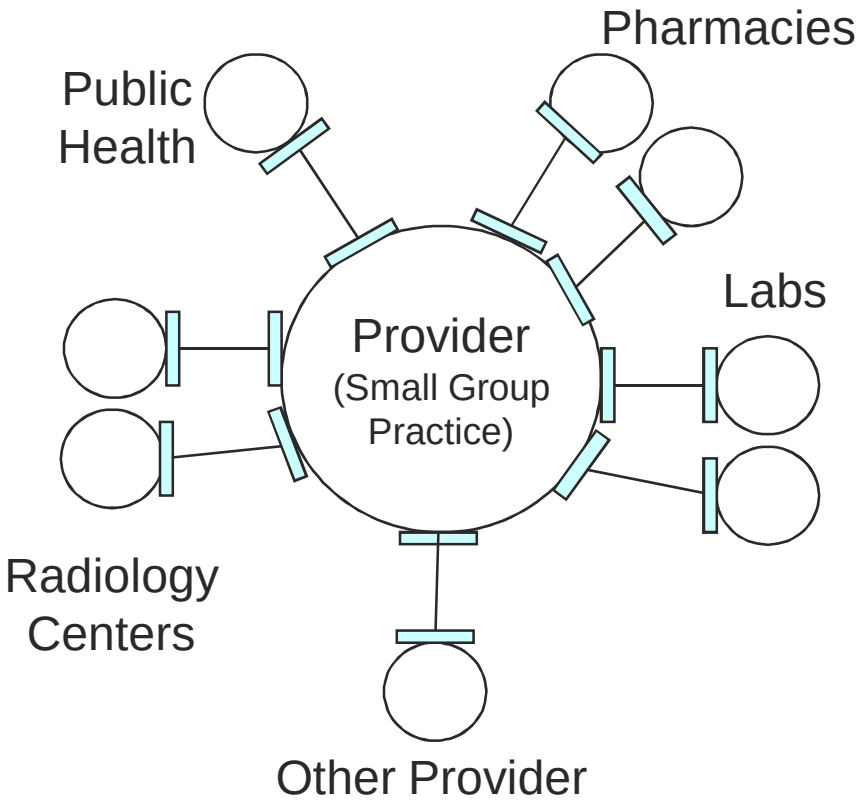
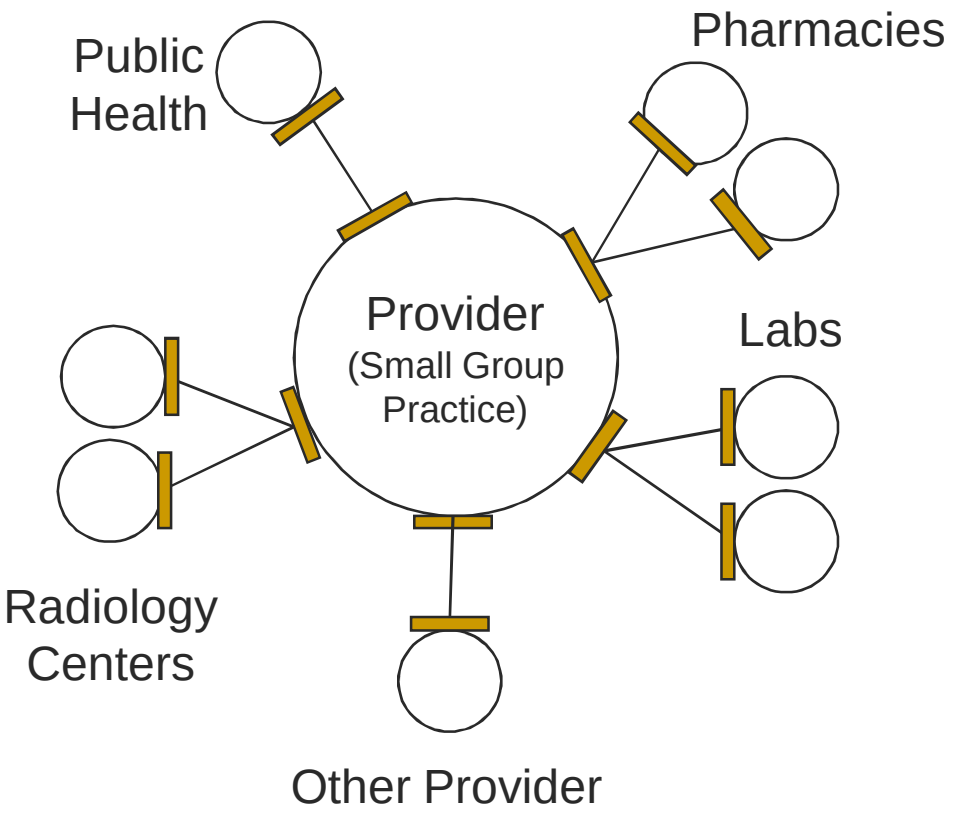
How Many Interfaces?

Level 3



Level 4



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HIEI Cost

	Level 3 Rollout	Level 4 Rollout	Level 3 Annual	Level 4 Annual
Office systems	$162.9 B		$9.1 B	
Hospital systems	$27.1 B		$1.6 B	
Office and hospital interfaces	$123.9 B	$75.7 B	$9.0 B	$5.4 B
Stakeholder interfaces	$6.4 B	$9.9 B	$0.5 B	$0.5 B
Total	**$320 B**	**$276 B**	**$20.2 B**	**$16.5 B**

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HIEI Principal Sources of Benefit

- HIEI produces two principal types of benefit
  - Administrative savings
    - Quantify the financial value of time saved by transitioning from manual to electronic data exchange
    - Benefit accrues to all entities that participate in data exchange
  - Utilization (Avoided redundancy)
    - Reduction in unnecessary lab and radiology tests
    - Results from interoperability between providers and labs, and providers and radiology centers
    - Benefit accrues to the entities who pay for tests: providers and payers

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HIEI National Value
Value=Benefit-Cost

	Value during 10-year Implementation	Value per year after Implementation
Level 2	$141 B	$22 B
Level 3	-$34 B	$24 B
Level 4	$337 B	$78 B

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

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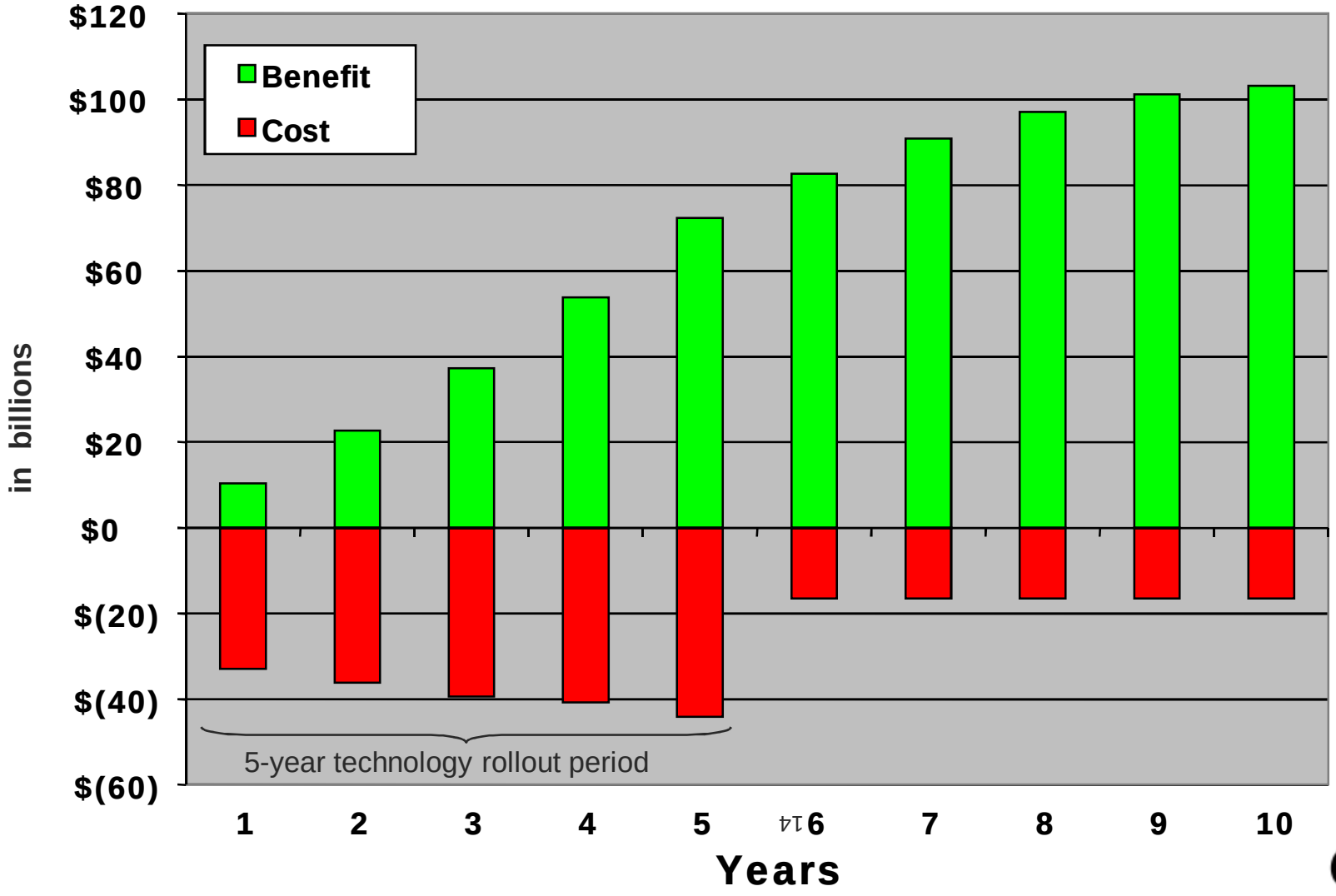
HIEI Level 4 Annual Cost-Benefit



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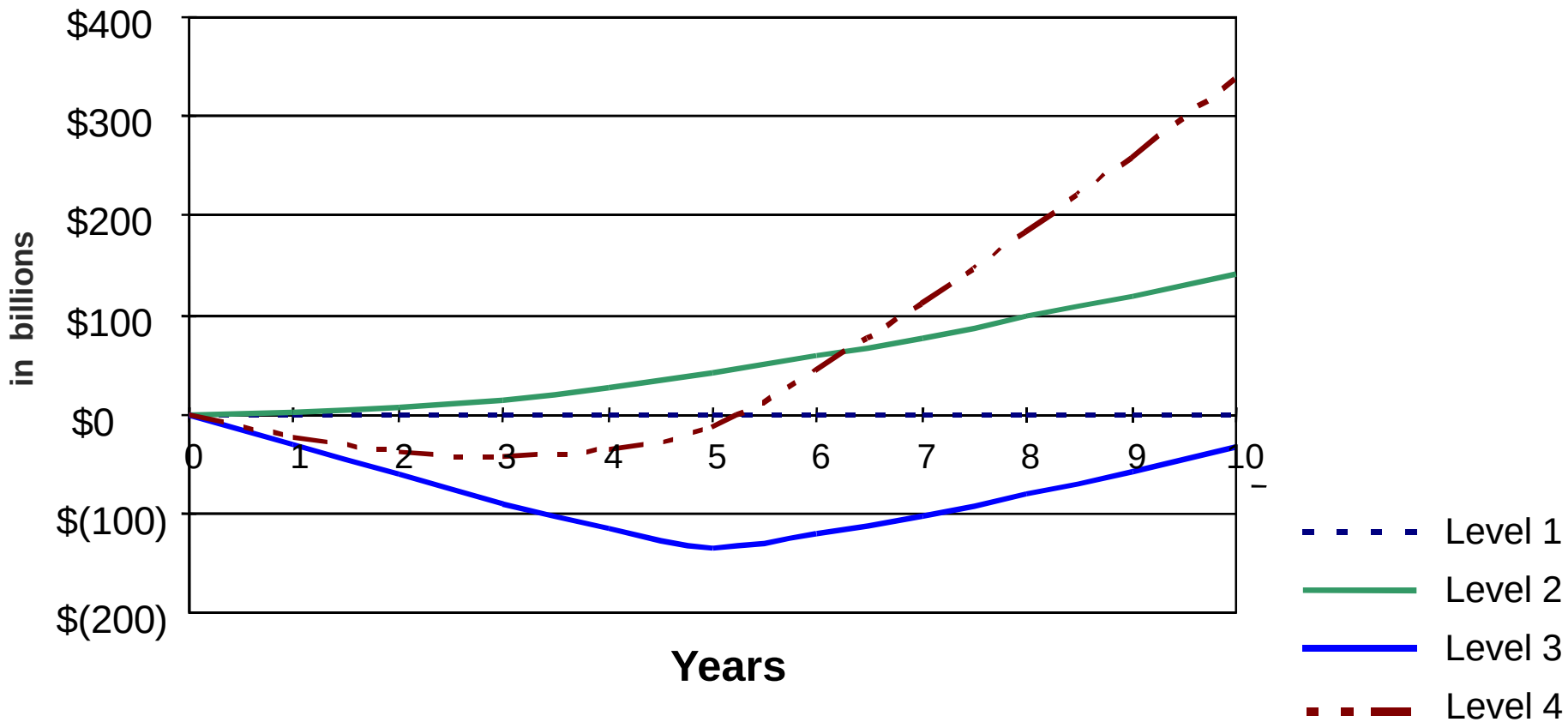
10-Year Cumulative Value



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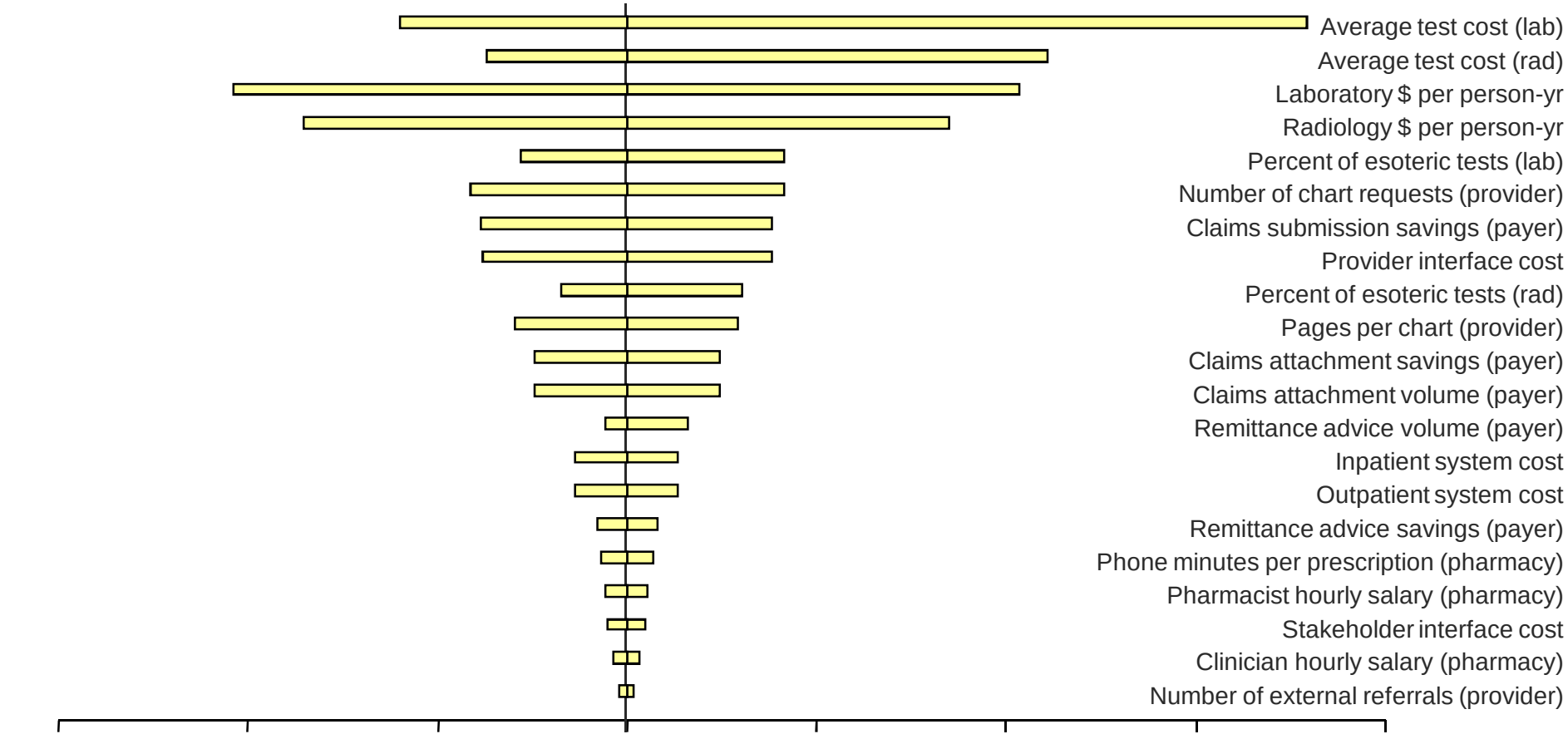
Sensitivity Analysis – Net Return



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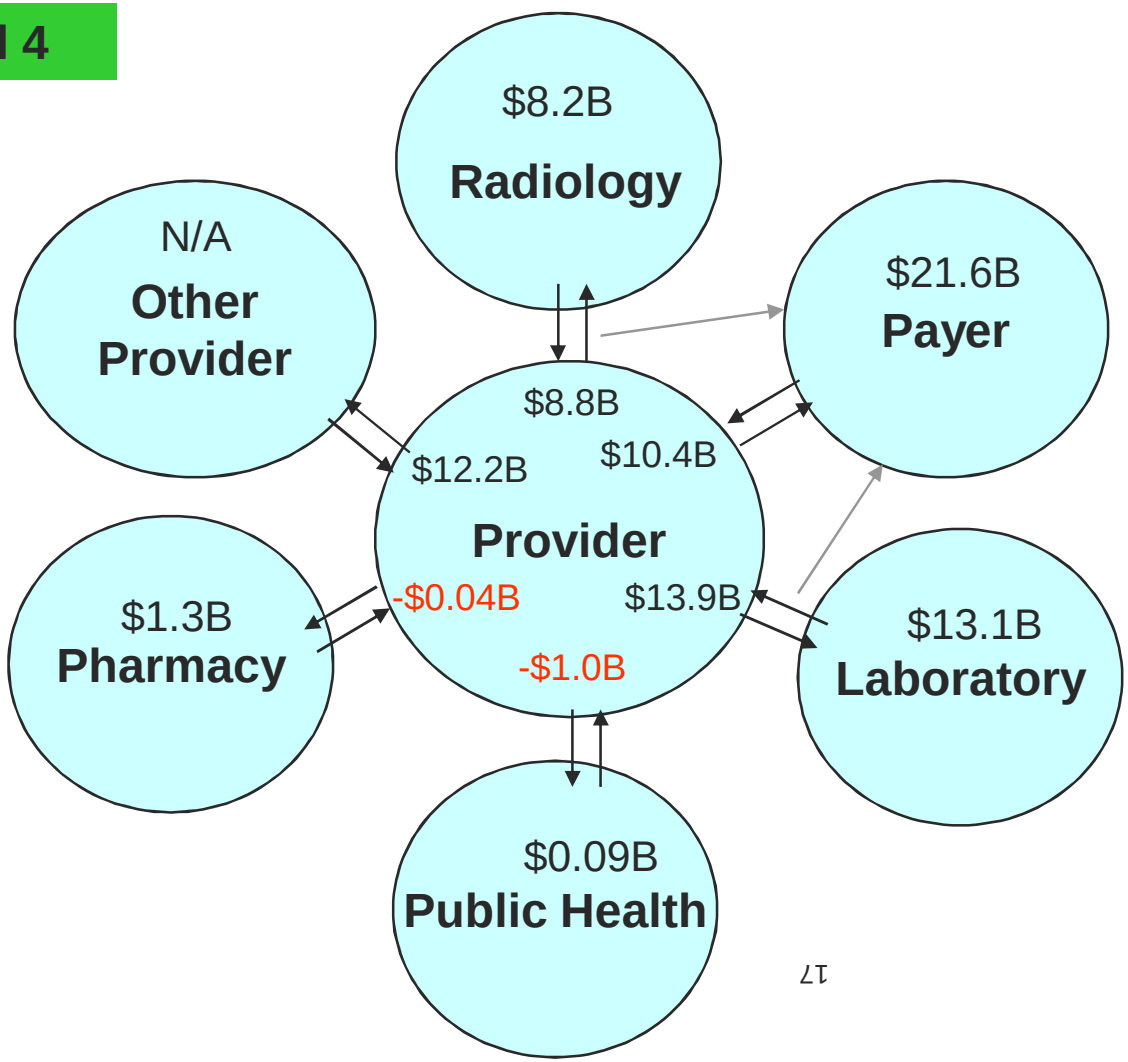
Steady-State Annual Value

Level 4



Total: $78 billion

Providers: $34 billion

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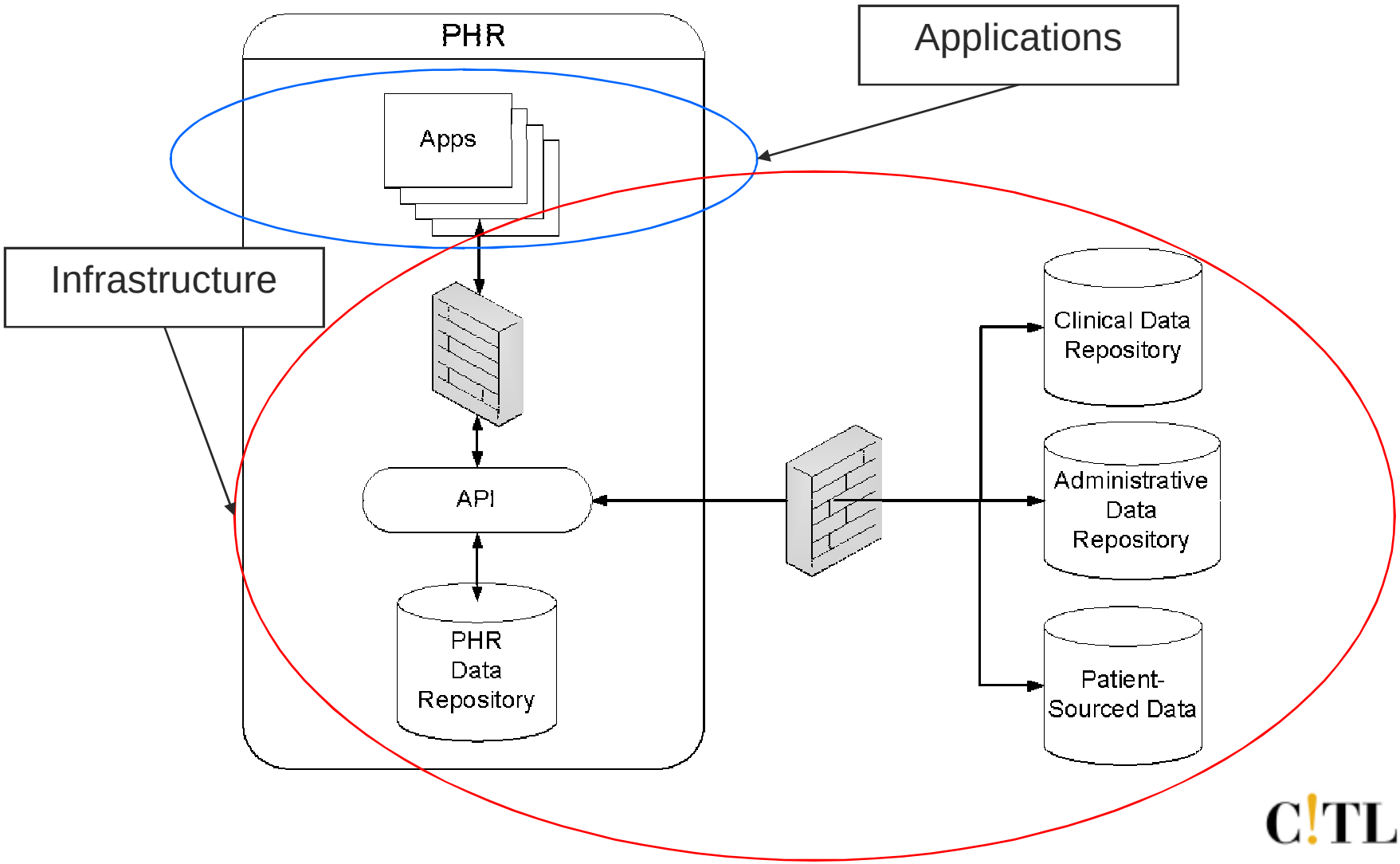
CITL's PHR Analysis

What is a PHR?



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Types of PHR Architectures

- Provider-tethered
  - Healthcare delivery organization's PHR
  - Connected to provider's EHR/PMS systems; clinical data
  - Messaging to external parties via electronic communication channels (e.g., secure messaging) IS1
  - No ability to incorporate external data automatically
- Payer-tethered
  - Payer's PHR
  - Administrative claims data
  - Messaging to external parties via electronic communication channels (e.g., secure messaging)
  - No ability to incorporate external data automatically; patient self-entered data supported (but not modeled)

IS1 secure messaging?

Partners Information Systems, 9/10/2008

Types of PHR Architectures

- Third-party
  - Aggregators of clinical, administrative and patient self-entered data
  - Not fully interoperable with provider and payer systems; one way data exchange supported, not automated
  - Communication between patients and providers supported by secure messaging
- Interoperable
  - Regional aggregator of data through automated data exchanges;
  - Full bi-directional, standardized data exchange
  - As all parties are connected, secure messaging occurs within PHR

Model Assumptions

- 10 years timeframe
  - 3-years for installation
  - 3-year adoption
  - 5-year use roll-out by patients
- Maximum adoption 80% of US population
  - Used to determine number of PHR installations

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Value Chains by PHR Architecture

Function	Architecture				Stakeholder Beneficiary
	Provider-Tethered	Payer-Tethered	Third-Party	Interoperable	
Sharing Complete Test Results	-	-	+	++	Capitation Split
Sharing Complete Medication Lists	-	-	-	++	Capitation Split
CHF Monitoring	+	+	+	+	Capitation Split
Smoking Cessation Monitoring	+	+	+	+	Capitation Split
Appointment Scheduling	++	+	+	++	100% Provider
Medication Renewals	++	+	+	++	100% Provider
Pre-encounter Questionnaires	++	+	+	++	100% Provider
E-visits	+	+	+	+	Capitation Split

Key

- no value model
+ value through manual data processing
++ value through automatic data processing

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PHR National Benefits by Architecture

PHR Function	Annual Benefit by PHR Architecture ($, millions)			
	Provider-Tethered	Payer-Tethered	Third-Party	Interoperable
Sharing Complete Test Results	n/a	n/a	3,300	7,900
Sharing Complete Medication List	n/a	n/a	n/a	9.2
CHF Monitoring	6,300	6,300	6,300	6,300
Smoking Cessation Managements	1,040	1,040	1,040	1,040
Appointment Scheduling	170	71	71	170
Medication Renewals	1,100	490	490	1,100
Pre-encounter Questionnaires	72	13	13	72
E-visits	4,800	4,800	4,800	4,800
TOTAL	**14,000**	**13,000**	**16,000**	**21,000**

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Cost Methodology

- Cost estimated for an underlying PHR infrastructure that can host any number of PHR applications
- Cost component consist of:
  - Acquisition costs
  - Annual costs
- Cost for single installation is then extrapolated to the nation

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Cost Components

- Data Center
- Clinical User Authentication
- Internet Connectivity
- User Interfaces
- User Support
- Doctor Matching
- Patient Matching
- Medication Matching
- Results Name Matching
- Results Answer Matching
- Interfaces
- Clinical Data Repositories
- PHR Data Repository
- Secure Messaging

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PHR Infrastructure Costs per Installation by Architecture

PHR Component	Provider-Tethered ($, thousands)		Payer-Tethered ($, thousands)		Third-Party ($, thousands)		Interoperable ($, thousands)	
	Acqu.	Annual	Acqu.	Annual	Acqu.	Annual	Acqu.	Annual
Data Center	1,700	930	1,700	900	1,700	900	1,700	900
Client User Authentication	95	14	95	14	95	14	95	14
Internet Connectivity	n/a	1	n/a	1	n/a	1	n/a	1
User Interface	450	90	450	90	450	90	450	90
User Support	n/a	25	n/a	930	n/a	220,000	n/a	1,500
Doctor Matching	n/a	n/a	n/a	n/a	n/a	57	n/a	57
Patient Matching	n/a	n/a	n/a	n/a	67	130	67	130
Medication Matching	n/a	n/a	n/a	n/a	n/a	17	n/a	17
Results Name Matching	n/a	n/a	n/a	n/a	n/a	460	n/a	460
Results Answer Matching	n/a	n/a	n/a	n/a	17	15	17	15
Interfaces	40	8	20	4	6,600,000	1,300,000	250	50
Clinical Data Repositories	n/a	n/a	n/a	n/a	400	100	400	100
PHR Data Repository	n/a	230	0	8.6	0	2,000	0	14
Secure Messaging	50	10	50	10	50	10	50	10
Total Infrastructure Cost	**2,300**	**1,100**	**2,300**	**2,000**	**6,600,000**	**1,500,000**	**3,000**	**3,400**

PHR Application Costs

- PHR applications add additional functionality and services to the PHR infrastructure
- CITL estimated the cost of a prototypical, web-based PHR application using the development cost of representative clinical and administrative PHR applications
- Average PHR Application Cost
  - Acquisition: $450,000
  - Annual: $90,000
- Cost was used for each of the six application functions

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Number of PHR Installation and Users per Installation

PHR Architecture	Number of Installations	Typical Number of Users
Provider-Tethered	26,478	9,113
Payer-Tethered	706	341,780
Third-Party	3	80,432,309
Interoperable	428	563,778

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Total National Costs by Architecture

	Provider-Tethered ($, millions)	Payer-Tethered ($, millions)	Third-Party ($, millions)	Interoperable ($, millions)
Acquisition	$130,000	$4,700	$21,000	$3,700
Annual	$43,000	$2,000	$4,900	$1,900

PHR Net Value at Steady-State

PHR Architecture	Steady State Net Value ($/year, million)
Provider-Tethered	$-29,000
Payer-Tethered	$11,000
Third-Party	$11,000
Interoperable	$19,000

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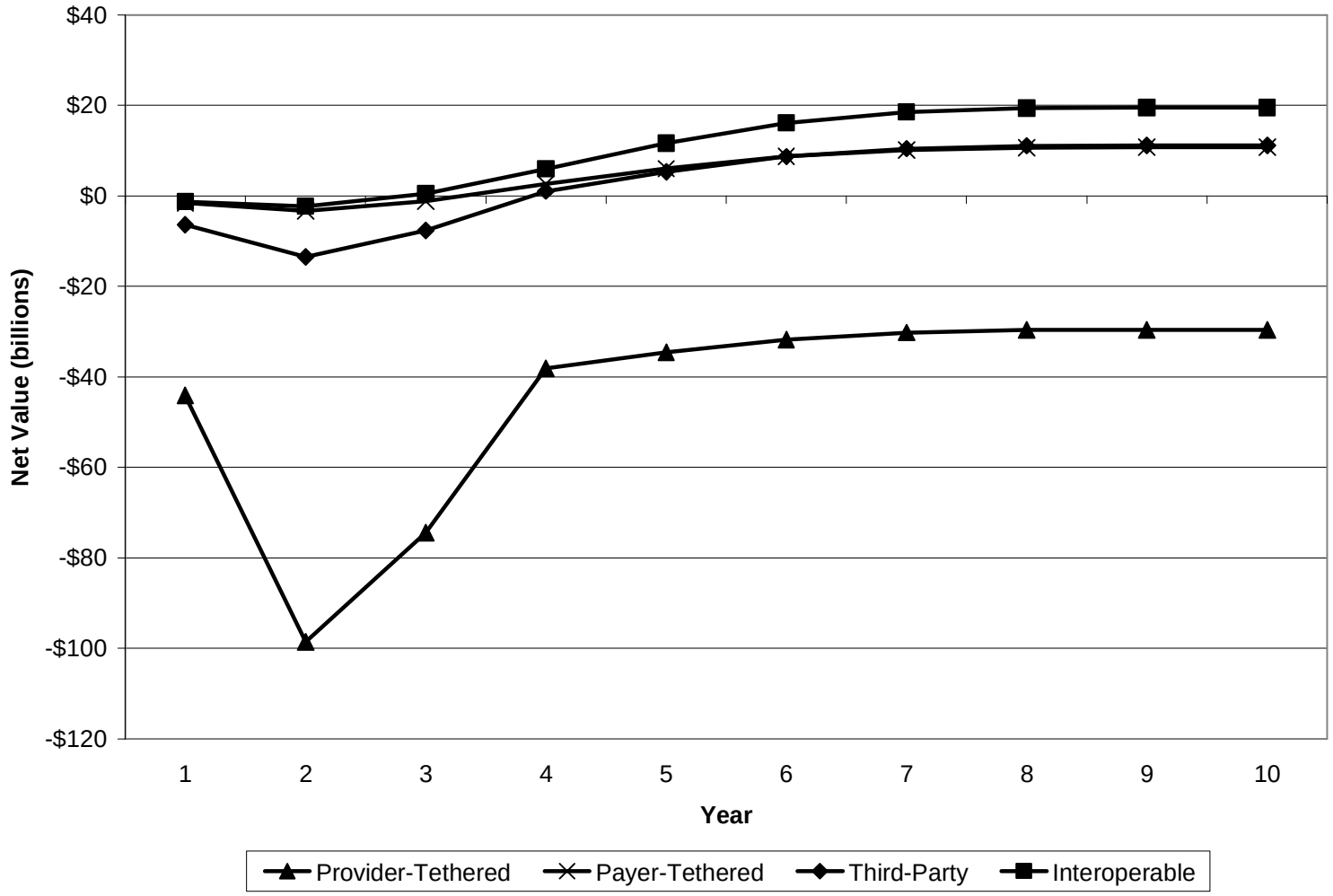
PHR Net Annual Benefit During Roll-out



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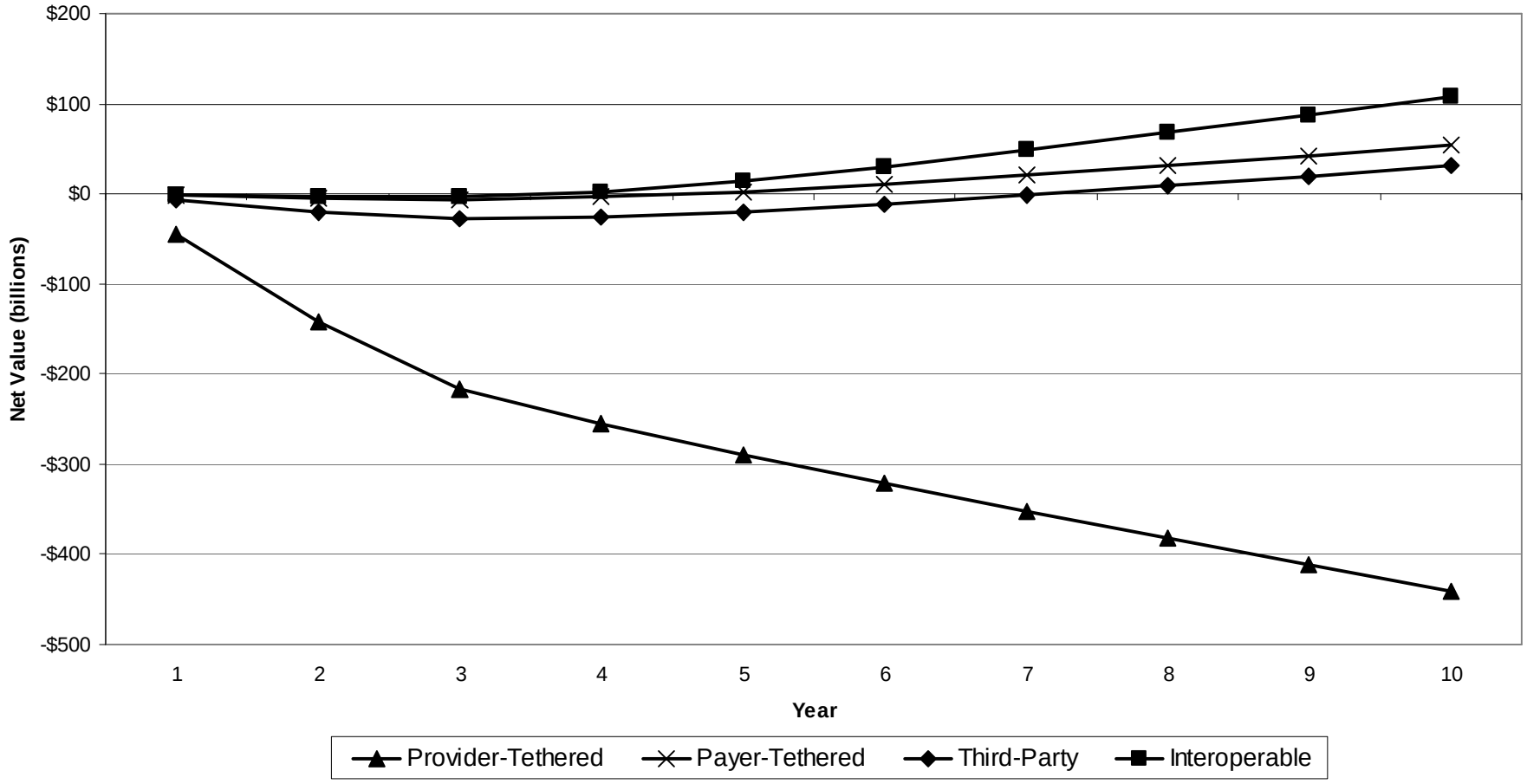
PHR Net Cumulative Benefit During Roll-out



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Benefits by Stakeholder

Stakeholder	Annual Benefit by PHR Architecture ($, millions)			
	Provider-Tethered	Payer-Tethered	Third-Party	Interoperable
Payers	11,000	11,000	14,000	19,000
Providers	2,300	1,500	1,700	2,800

Number of Users to “Break-even”

PHR Architecture	Patients
Provider-Tethered	59,000
Payer-Tethered	64,000
Third-Party	47,000,000
Interoperable	52,000

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Net Value Distribution

- Investigated the size of installers for both provider-tethered and payer-tethered PHRs
- Provider-tethered PHR categories:
  - IDNs
  - Large provider groups (groups with 16 MDs or greater)
  - Medium-sized provider groups (groups with 7 to 15 MDs)
  - Small provider groups (groups with 2 to 6 MDs)*
- Payer-tethered PHRs categories:
  - Public payers (e.g., Medicare, Medicaid)
  - Largest non-public payer in each state
  - Second largest payer in each state
  - Remaining largest 50% of all payers

*Due to 80% coverage assumption, single provider practices were excluded from the analysis

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Provider-Tethered PHR: Steady-State Net Value by Size

Provider	Number of Installations	Cumulative Coverage	Cumulative Net Value
IDN	1,453	50%	$8 Billion
IDN + Large	1,718	65%	$6.4 Billion
IDN + Large + Medium	3,742	70%	$0.84 Billion
IDN + Large + Medium + Small	19,566	80%	$-29 Billion

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Payer-Tethered PHR: Steady-State Net Value by Size

Payer Size	Number of Installations	Cumulative Coverage	Cumulative Net Value
Public	56	27%	$8 Billion
Public + 1st Largest	56	52%	$9.7 Billion
Public + 1st Largest + 2nd Largest	51	62%	$10 Billion
Public + 1st Largest + 2nd Largest + Remaining Largest 50%	548	80%	$11 Billion

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Conclusions

- PHRs have the potential to save the US $19 billion per year in direct health savings from:
  - Decreased testing and errors
  - Decreased administrative costs
  - Decreased clinical costs

- The keys to these savings are:
  - Easy electronic information exchange and interoperability between PHRs and other health information systems
  - PHRs that cover large segments of the US population
  - Widespread PHR adoption and effective use

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RHIO/NHIN vs. PHR???

- “Let’s bring everything to the clinician!”
- At the point of care?
- At the point of decision-making?
- Organized?
- Everything?*
- Everything Organized???*

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Two “Childhood” Stories

- The Big Project
  - Healthcare vs. Banking
- The Big Exposé
  - Technology vs. Humans

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Thank you!

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