

Using a Statewide HIE to Promote Information Technology Adoption by Physicians



Rebecca L. Little
Medicity, Inc.

Gina B. Perez, MPA
Advances in Management, Inc.

Sandy Phillips
Perot Systems



Discussion Topics

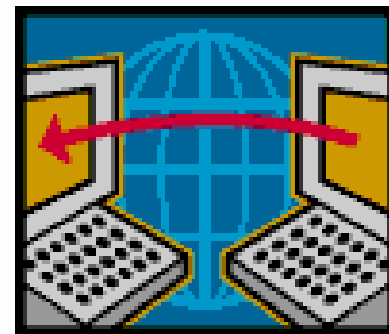
- Overview of DHIN
- Implementation Approach
- Technical Design
- Promoting physician adoption of information technology
- Considerations

Overview of DHIN



Purpose of the DHIN

- Created statutorily in 1997 as a public instrumentality of the State of Delaware
 - To advance the creation of a statewide health information and electronic data interchange network for public and private use.
 - To be a public-private partnership for the benefit of all citizens of Delaware
 - To address Delaware's needs for timely, reliable and relevant health care information.

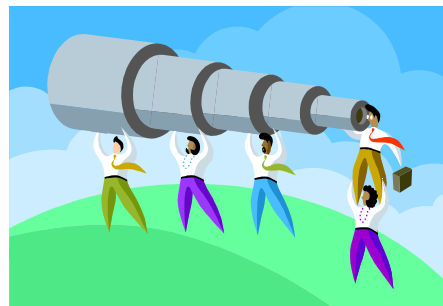


DHIN Membership

- Consumers
- Delaware Health Care Commission
- Delaware Healthcare Association
- Delaware State Chamber of Commerce
- Delaware state government agencies
 - Department of Technology and Information
 - Division of Public Health
 - Department of Insurance
 - State Budget Office
- Insurance providers, including Blue Cross Blue Shield of Delaware, Coventry and Delaware Physicians Care
- Large employers, including AstraZeneca and Bank of America
- Medical Society of Delaware
- University of Delaware

Project Vision

Develop a network to exchange real-time clinical information among all health care providers (office practices, hospitals, labs and diagnostic facilities, etc.) across the state to improve patient outcomes and patient-provider relationships, while reducing service duplication and the rate of increase in health care spending.



Implementation Approach



Missing Clinical Information

Clinical information missing in 13.6% of primary care visits

- Lab results - 6.1%
- Dictation - 5.4%
- Radiology results - 3.8%
- H&P - 3.7%
- Medications - 3.2%

Judged to:

- Adversely affect care - 44%
- Delay care - 59%

(“*JAMA*”, January 2005)

Cost Reductions

- Results Distribution Costs
 - Reduced chart pulls
 - Filing, copying, faxing, mailing, receiving
 - Productivity saving
 - Calling
 - Referring
 - Looking for missing information
- Cost Avoidance
 - Visits
 - Lab tests
 - Imaging studies



Considerations

- Clinical software and infrastructure model
 - Information reliability, security, availability
Doctors only give you one shot to get it right...
- Project Governance
- Cultural Alignment
- Sustainability
- Partnership Approach

Phase 1 - Results Distribution

Who contributes?

- 3 Hospital Systems and LabCorp
 - 85% Laboratory testing across the state
 - 81% Admissions across the state

What data is contributed?

- Laboratory & pathology
- Reports (face sheets, discharge summaries, radiology and other transcribed documents)
- Harmonized demographics
- 36 interfaces
- Implemented in 6 months

Phase 1 - Results Distribution

Who uses the data?

- Physicians
- Physician office staff

How is that data distributed to users?

- Web-based clinical inbox
- EMR integration
- Auto printing and auto faxing



- Maintenance
- Print Queue
- INBOX**
- Clinical (16)



CLINICAL INBOX ?

Refresh Select All Print Fax Forward Remove

Facility:
 Report Type:
 Status:
 Abnormals Only

		PATIENT	DATE/TIME	DESCRIPTION	VIEWED	FACILITY
<input type="checkbox"/>		TREE, ABAGAIL	3/26/2007 3:37:28 PM	PROTHROMBIN TIME	✓	Christiana Care
<input type="checkbox"/>		PREFERENCE2, D2	3/26/2007 3:35:22 PM	HEPARIN XA, LMW (OTHER)		Beebe Medical Center
<input type="checkbox"/>		PREFERENCE3, D3	3/26/2007 3:26:53 PM	LIPID PROFILE		Beebe Medical Center
<input type="checkbox"/>		TEST, OLAY B	3/26/2007 2:28:56 PM	SP		Beebe Medical Center
<input type="checkbox"/>		WRENCH, ALICIA H	3/26/2007 2:28:54 PM	SP	✓	Beebe Medical Center
<input type="checkbox"/>		ZZFRUITY, DRINK	3/26/2007 2:20:28 PM	CHEST PA AND LATERAL	✓	Christiana Care
<input type="checkbox"/>		PREFERENCE1, D1	3/26/2007 10:50:02 AM	C DIFF. TOXIN		Beebe Medical Center

TREE, ABAGAIL MRN: 00000000036728 (CC) + AGE: 40 years FEMALE

Facility Name: Christiana Care
 Admitting Physician: HUNTER COWEN
 Admit Date: 01/25/2007
 Attending Physician:
 Discharge Date: 03/26/2007

TEST NAME	RESULT	OUT OF RANGE	REFERENCE	UNITS
Accession : 0000700400022		Ordering Phys. : HUNTER COWEN		Priority : ROUTINE
Collection Date : 01/04/2007 09:54a		Received Date : 01/04/2007 09:54a		
PROTHROMBIN TIME Status: FINAL				
DRAWN	VENOUS			
COUMADIN	YES			
HEPARIN	NO			
PROTIME	12.0		10.0-13.3	SEC
Generalized guidelines for Anticoagulant monitoring are available from the NTE				
INR	1.0			
The INR (International Normalized Ratio) is a standardized scale for monitoring patients on stable Oral Anticoagulant therapy. If you have any questions call the Coag Lab at 733-3708.				



- Maintenance
- Print Queue
- INBOX**
- Clinical (16)

CLINICAL INBOX ?

Refresh Select All Print Fax Forward Remove

Facility: All Report Type: All Status: All Abnormals Only

		PATIENT	DATE/TIME	DESCRIPTION	VIEWED	FACILITY
<input checked="" type="checkbox"/>		TREE, ABAGAIL	3/26/2007 3:37:28 PM	PROTHROMBIN TIME	✓	Christiana Care
<input type="checkbox"/>		PREFERENCE2, D2	3/26/2007 3:35:22 PM	HEPARIN XA, LMW (OTHER)		Beebe Medical Center
<input type="checkbox"/>		PREFERENCE3, D3	3/26/2007 3:26:53 PM	LTPID PROFILE		Beebe Medical Center
<input type="checkbox"/>		TEST, OLAY B	3/26/2007			
<input type="checkbox"/>		WRENCH, ALICIA H	3/26/2007			
<input type="checkbox"/>		ZZFRUITY, DRINK	3/26/2007			
<input type="checkbox"/>		PREFERENCE1, D1	3/26/2007			

TREE, ABAGAIL MRN: 00000000036728 (CC) + AGE: 40 years FEMALE
 Facility Name: Christiana Care
 Admitting Physician: HUNTER COWEN
 Attending Physician:

TEST NAME	RESULT	OUT OF RANGE
Accession : 0000700400022		Ordering Physician
Collection Date : 01/04/2007 09:54a		Received Date
PROTHROMBIN TIME Status: FINAL		
DRAWN	VENOUS	
COUMADIN	YES	
HEPARIN	NO	
PROTIME	12.0	
INR	1.0	

Generalized guidelines for Anticoagulant monitoring are available from
 The INR (International Normalized Ratio) is a standardized scale for monitoring patients on stable Oral Anticoagulant therapy. If you have any questions call the Coag Lab at 733-3708.

Forward Result - Windows Internet Explorer

Search for the Provider, who will receive a forwarded copy of the selected result. Forward Search Cancel

Provider Name: Organization: All

Search Results : Select One Provider

PROVIDER	ORGANIZATION	ADDRESS
<input type="checkbox"/> Provider, BH	Bayhealth Medical Center	640 South State Street Dover, DE 19901
<input checked="" type="checkbox"/> Testing, McKensie	Bayhealth Medical Center	640 South State Street Dover, DE 19901
<input type="checkbox"/> Testing, Renee	Bayhealth Medical Center	640 South State Street Dover, DE 19901

Add Comments
 Please see attached lab |

Phase 2 - Patient Record Inquiry

Who contributes?

- Hospitals
- Commercial laboratories
- Stand-alone imaging centers
- Pharmacies and PBMs
- Medicaid

What new data is contributed?

- Medication history
- Medical images
- Additional data providers

Phase 2 - Patient Record Inquiry

Who else uses the data?

- Emergency Departments
- Public Health

How is data distributed to users?

- Web - Clinical Inbox
- EMR Integration
- EMR-Lite
- Auto Printing and Faxing



- er Name
- MRN:
- al
-
-
-
-
-
-
-
-
- 16 New

ProAcc

Search Results

<input checked="" type="checkbox"/>	LAST	FIRST	MI	SSN	DOB
<input type="checkbox"/>	DELAWARE	WILSON			01/25/1977
<input type="checkbox"/>	DELAWARE	WILSON		xxx-xx-9494	03/24/1941
<input type="checkbox"/>	DELAWARE	WILSON		xxx-xx-3333	10/25/1969
<input type="checkbox"/>	DELAWARE	WILSON			12/19/1958
<input type="checkbox"/>	DELAWARE	WILSON		xxx-xx-9999	10/25/1969
<input type="checkbox"/>	DELAWARE	WILSON			01/25/1977
<input type="checkbox"/>	DELAWARE2	WILSON			09/08/1939
<input type="checkbox"/>	DELAWARE2	WILSON			
<input type="checkbox"/>	DELAWARE3	WILSON			02/04/1929
<input type="checkbox"/>	DELAWARE3	WILSON			
<input type="checkbox"/>	DELAWARE4	WILSON			01/01/1931
<input type="checkbox"/>	DELAWARE4	WILSON			
<input type="checkbox"/>	DELAWARE5	WILSON			07/05/1990
<input type="checkbox"/>	DELAWARE5	WILSON			



HOME LOGOUT

er Name
MRN:

DELAWARE, WILSON MRN: 000000000055555 (CHR) + AGE: 29 years MALE

Patient Information Face Sheets Reports Orders Encounters Tests Trend

ProAcc

Referral Pri

Search

Census

Maintenance

MR Print

Prescription

Messaging

Order Portal

INBOX

15 New

PERSONAL

Name WILSON DELAWARE
Address 1435 SYCAMORE VALLEY DRIVE
DOVER, DE 19901
Home Phone (302)555-1111
Work Phone
Birth Date 01/25/1977
SSN
MRN 000000000055555 (CHR)
Sex MALE
Race
Religi
Marita

RESP

Name

Address

Home

SSN

Relati

EMER

Name

Home Phone

Work Phone

Relationship

INSURANCE

Primary

Check Eligibility

Company

Group Name

Group #

Pol/SS #

ALLERGIES

MRN	FACILITY
<input checked="" type="checkbox"/> 000000000055555	(CHR)
<input checked="" type="checkbox"/> 000000000044444	(CHR)
<input checked="" type="checkbox"/> 000000000033333	(CHR)
<input checked="" type="checkbox"/> 000000000022222	(CHR)
<input checked="" type="checkbox"/> 000000000011111	(CHR)
<input checked="" type="checkbox"/> 999909494	(BB)
<input checked="" type="checkbox"/> 9056689	(BAY)
<input checked="" type="checkbox"/> 28499699030	(LCA)
<input checked="" type="checkbox"/> 28499699100	(LCA)
<input checked="" type="checkbox"/> 28499699080	(LCA)
<input checked="" type="checkbox"/> 28499699070	(LCA)
<input checked="" type="checkbox"/> 28499699060	(LCA)
<input checked="" type="checkbox"/> 28499699050	(LCA)
<input checked="" type="checkbox"/> 28499699040	(LCA)
<input checked="" type="checkbox"/> 28499699020	(LCA)
<input checked="" type="checkbox"/> 28499699010	(LCA)

Request Data Deselect All

LINKED PATIENTS MRN DATE ADDED

DELAWARE, WILSON		05/27/2006
DELAWARE2, WILSON		05/26/2006
DELAWARE3, WILSON		05/26/2006
DELAWARE4, WILSON		05/26/2006
DELAWARE5, WILSON		05/26/2006

https://secure11.medicity.com - Requ...

Select Sources Request Data Deselect All Cancel

- Lab
- Rad
- Trans
- Med

Done Internet



HOME LOG OUT

- Search
- Census
- Maintenance
- MR Print
- Prescription
- Messaging
- Order Portal
- INBOX
- 19 New

Clinical Inbox

Download Refresh Batch Sign Select All Print Fax History Remove

<input type="checkbox"/>			WILSON DELAWARE2, WILSON	6/9/2006 10:53:59 PM	INTRAVASCULAR COAG S		Christiana Medical Center
<input checked="" type="checkbox"/>			DELAWARE2, WILSON	6/9/2006 10:51:32 PM	CYCLOSPORINE	<input checked="" type="checkbox"/>	Christiana Medical Center
<input checked="" type="checkbox"/>			DELAWARE, WILSON	6/9/2006 10:51:22 PM	COMPLETE BLOOD COUNT	<input checked="" type="checkbox"/>	Beebe Medical Center
<input checked="" type="checkbox"/>			DELAWARE, WILSON	6/9/2006 10:50:16 PM	CBC WITH DIFF	<input checked="" type="checkbox"/>	Bayhealth Medical Center
<input type="checkbox"/>			WILSON DELAWARE, WILSON	6/9/2006 10:50:07 PM	XR CHEST PA/LATERAL 71020		Bayhealth Medical Center

Save a Copy Select 100% Adobe Reader 7.0

Pages Attachments Comments



Laboratory Report

Printed on: 06/09/2006 06:51p EDT

Patient DELAWARE2, WILSON		MRN 00000000022222		Facility Name Christiana Medical Center		Attending Physician		Admit Date 01/01/1900	
Soc. Sec. #	Date Of Birth	Age	Sex	Admitting Physician				Discharge Date	

Test Name	Result	Out of Range	Reference	Units
Accession: 0000510100002	Ordering Phys: JAMES DOCTOR	Priority: ROUTINE	Collection Date: 01/11/2006 09:13a	Received Date: 01/11/2006 09:13a
CYCLOSPORINE				Status: FINAL

DHIN Functional Priorities by Year

2006-2007	<ul style="list-style-type: none">• Secure results delivery with inbox management• Security access controls• Audit processing• EMR interfaces• Master patient index harmonization
2007-2008	<ul style="list-style-type: none">• Inquiry• Viewing of patient-centric data• Public Health reporting• Consumer participation• Medication history• eOrdering• ePrescribing

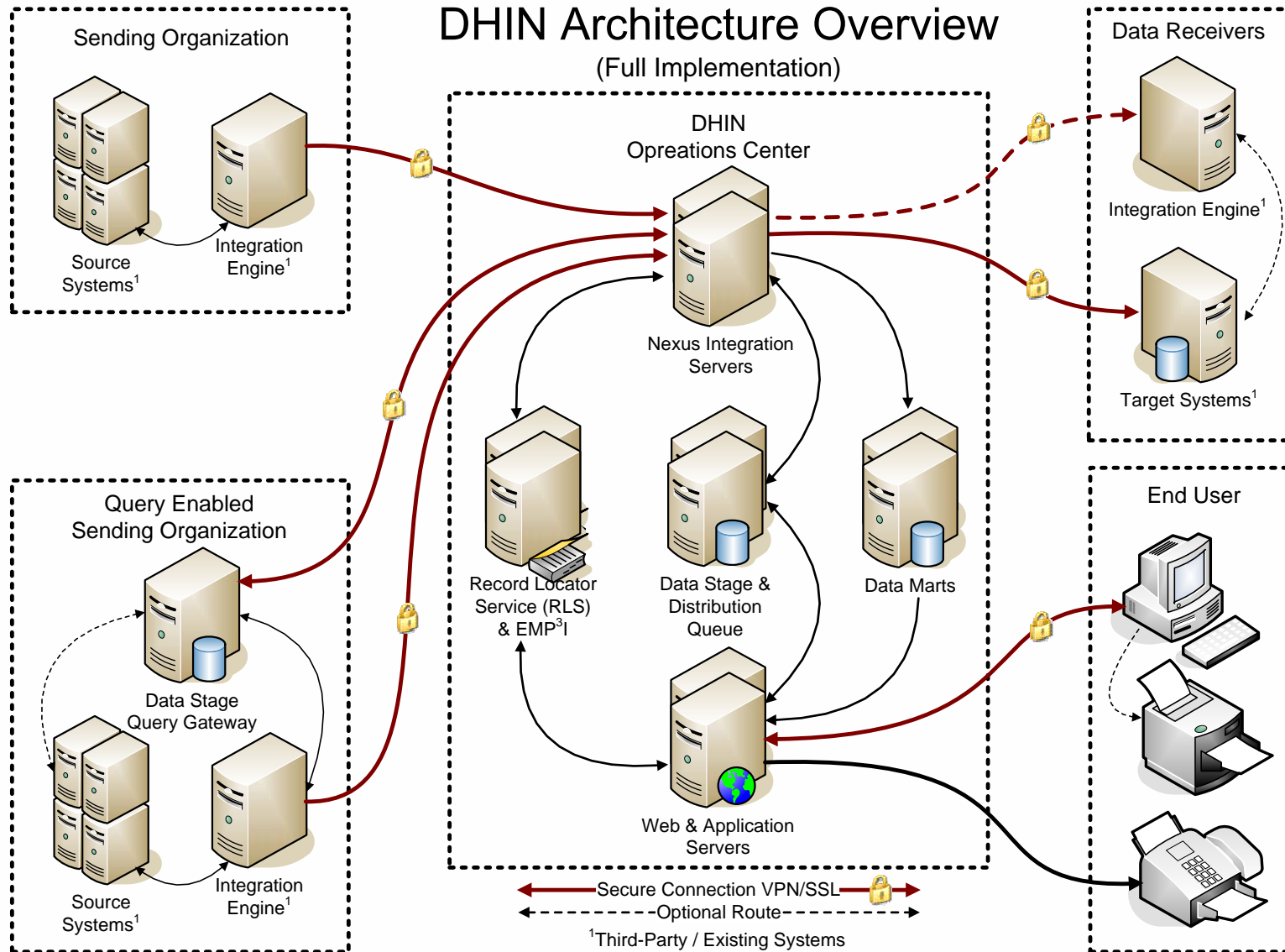
DHIN Functional Priorities by Year

2008-2009	<ul style="list-style-type: none">• eSignature• Patient portal
2009-2010	<ul style="list-style-type: none">• Benefit eligibility and claims processing• Population health
2010-2011	<ul style="list-style-type: none">• Chronic care management• Incentive and outcome management
2011-2012	<ul style="list-style-type: none">• Data warehouse

Technical Design



DHIN Architecture Overview (Full Implementation)



Technical Design

- Leverages existing technical infrastructure within healthcare organizations to create a utility allowing providers to retrieve data on their patients
 - Data transmitted from each data sender to a data-sender-specific DataStage (cache) via existing interface engines in current HL7 standard format using TCP/IP over a secure VPN
 - Leverages the Internet for ubiquitous access and reduced technical needs in the provider's office

Technical Design

- Designed around an Enterprise Architecture
 - Framework specifically designed to support the business objectives of healthcare organizations and providers
 - SOA (Service Oriented Architecture)
 - Abstracts data into services that can be consumed by external sources
 - EMRs
 - Automatic faxing and printing
 - Leveraged data architecture that can make data available through UI, third party EMRs, printing and faxing as required by the receiving organizations
 - Confederated data model housing data in segregated repositories

Data Management

- Hosting
 - Hosted in Perot's Plano Technology Center
- Platform
 - Built on Microsoft DNA
 - .Net v2.0; SQL Server 2005 Enterprise; Windows Server 2003 Enterprise
- Security
 - 128-bit SSL encryption
 - Robust security and access control model
 - Complete auditing and logging
- Scalability & High Availability
 - Load balanced web servers
 - SAN infrastructure
 - Clustered database servers
 - Redundant firewalls & network infrastructure
- Disaster Recovery
 - Provided by SunGuard in coordination with Perot services

Promoting Physician Adoption



Physician User Adoption Goals

- There are approximately 1800 physicians practicing medicine in Delaware
- Three-year adoption goal: 1500 users
 - Phase 1-results delivery: 100
 - Phase 2-inquiry: 800
 - Phase 3-inquiry and added data: 600

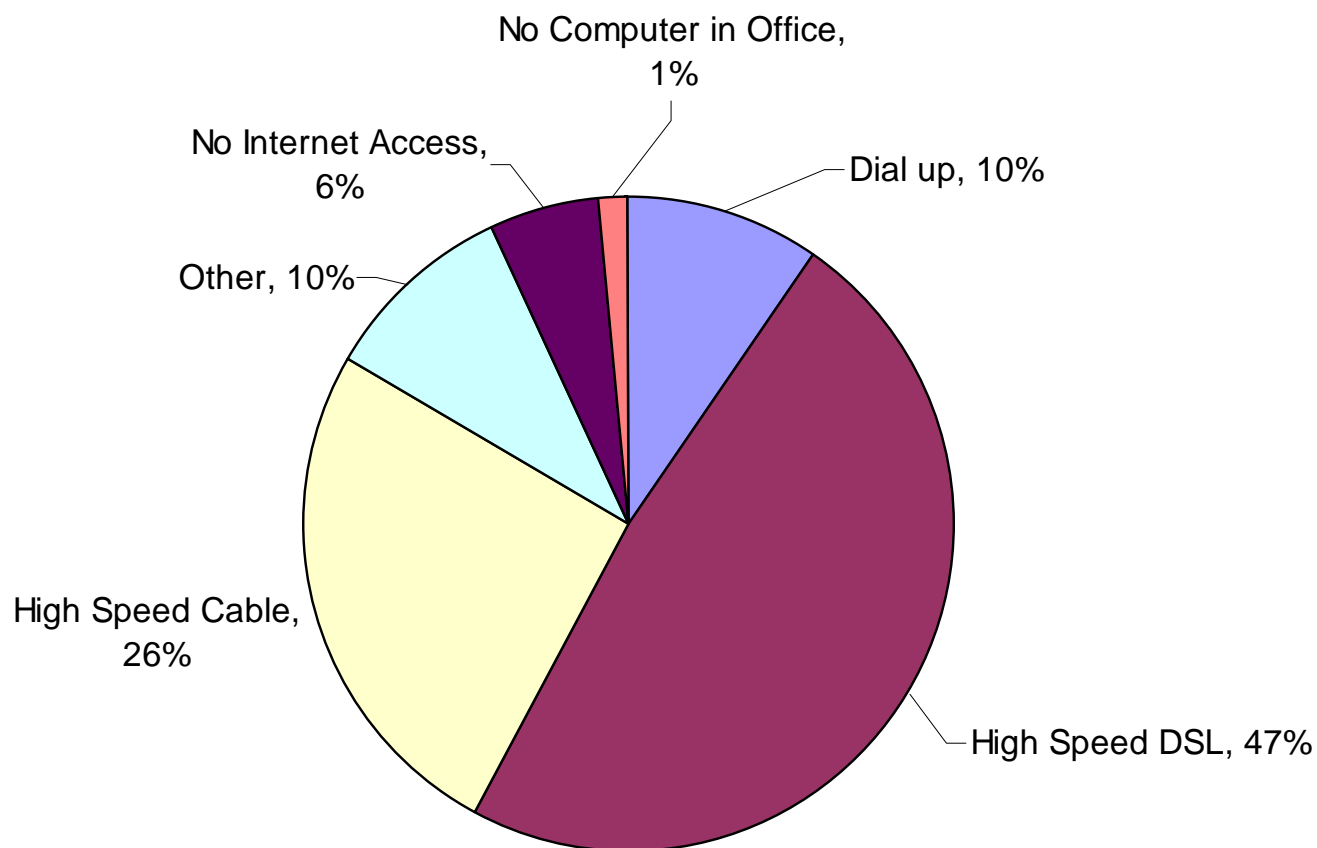
Success of the HIE is dependent on physician adoption

- Elimination of current process to drive adoption
- Design supports physicians regardless of their level of technology adoption and can manage need along the adoption curve
 - “Un-connected” physician
 - Physician interested in adopting technology
 - DHIN supports an EMR-Lite
 - Provides a starter set of data for physicians interested in adopting an ambulatory EMR

Success of the HIE is dependent on physician adoption

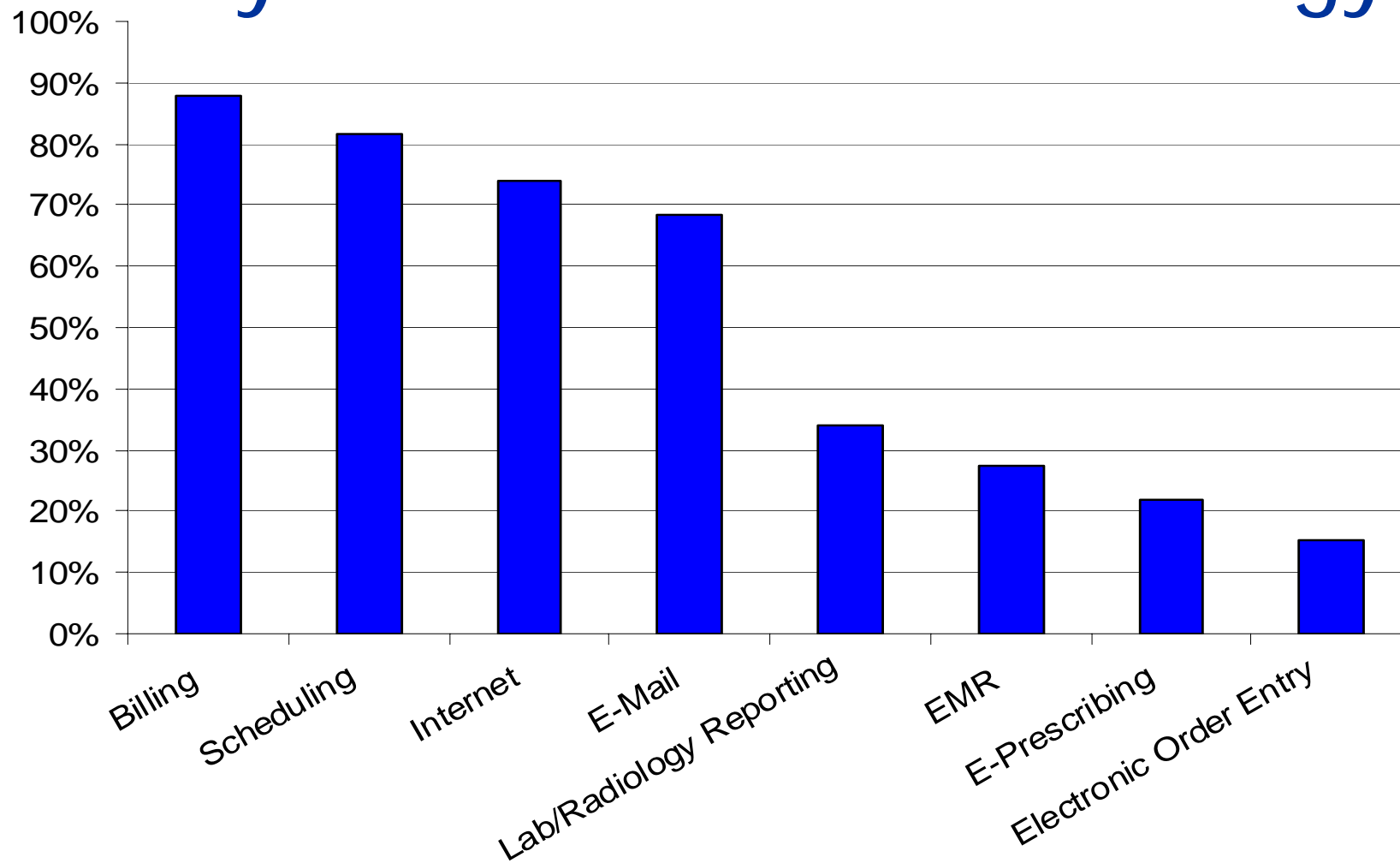
- Physicians interested in adopting technology
 - eOrdering
 - ePrescribing
 - Results management
- Supports physicians who have adopted an EMR
 - Direct EMR integration from the Utility

Physician Access to Technology



Source: University of Delaware Center for Applied Demography and Survey Research, *Primary Care Providers in Delaware 2006*

Physician Use of Technology

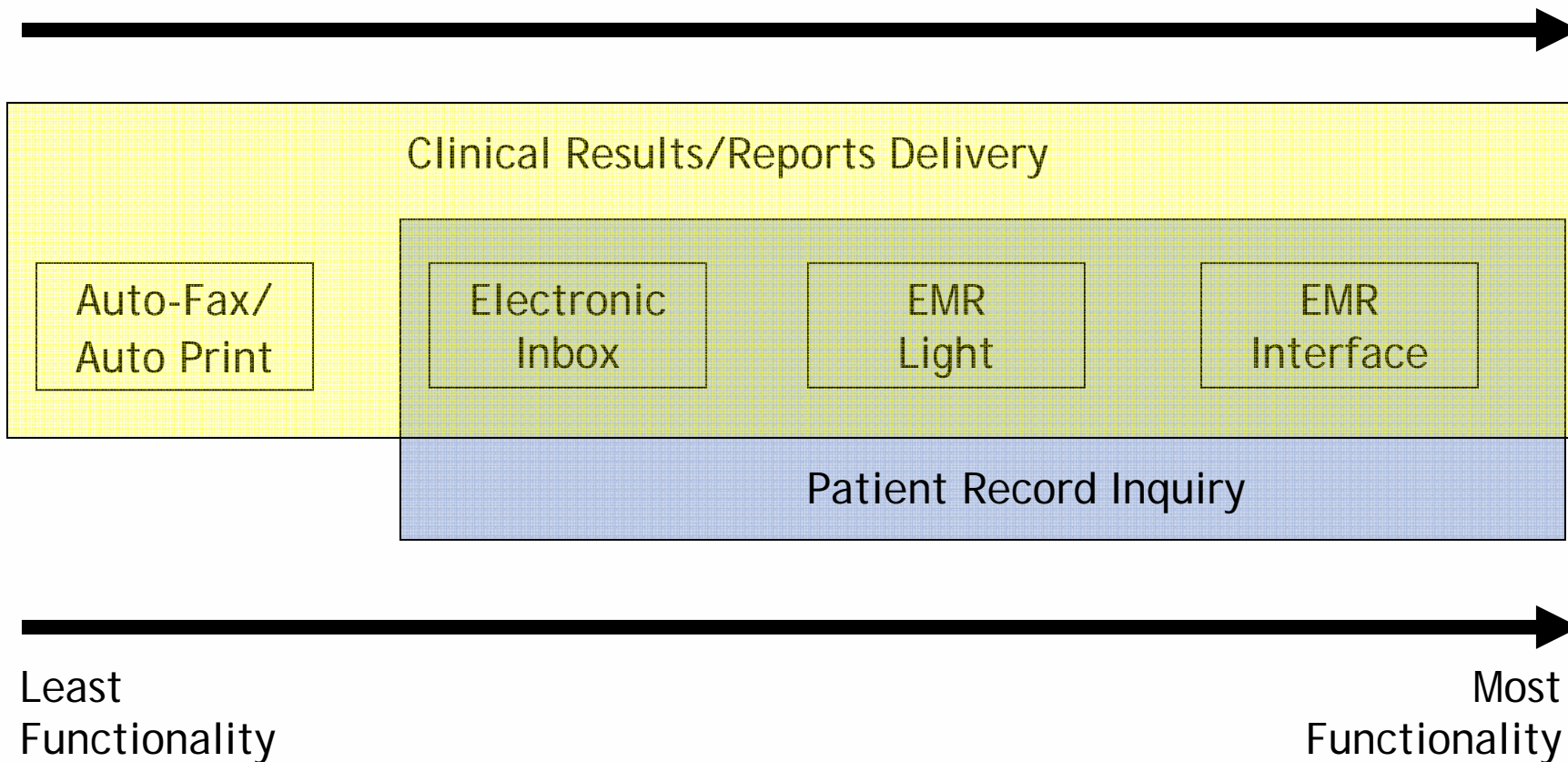


Source: University of Delaware Center for Applied Demography and Survey Research, *Primary Care Providers in Delaware 2006*

From Paper to EMR Adoption

Low Users of
Technology

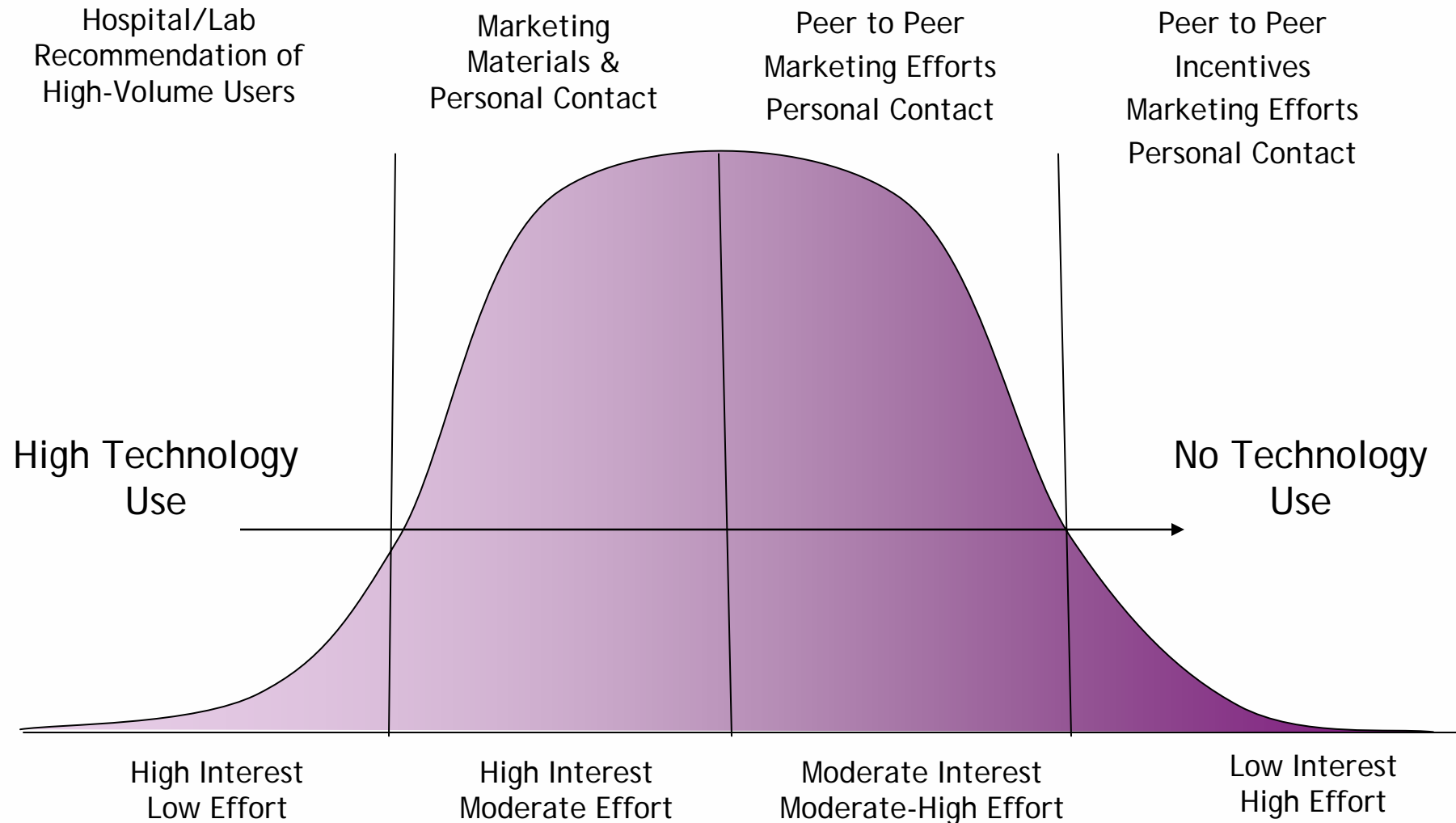
High Users of
Technology



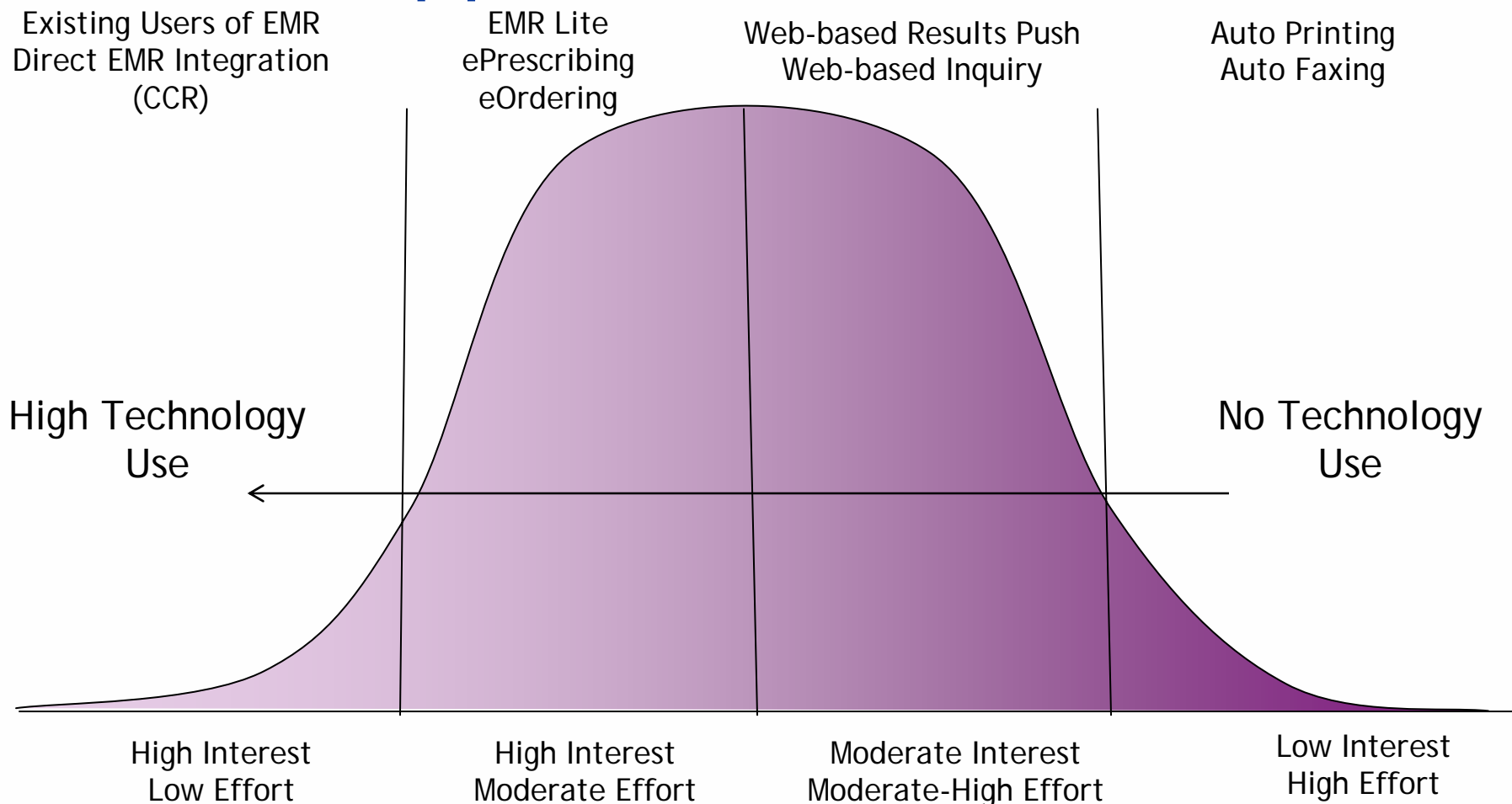
Interest in DHIN

- 85% of primary care providers are interested in participating in DHIN
- 10% would be willing to pay per transaction
- Those currently using EMRs are twice as likely to participate in DHIN
- Those using the least technology in their practices are least likely to participate in DHIN
- Those using EMRs are willing to pay more for access to DHIN data

Marketing Approach



Marketing Approach Tied to Applicable Function



*Information exchange like EMR
implementation is a journey...*

And all good journeys take time...

...the Journey Involves:

- Planning and consensus building
- Creating a business model
 - Leveraging funding sources
 - Migrating to self sustaining HIE
- Defining the clinical model
 - Information reliability and availability
 - Doctors only give you one shot to get it right...*
 - Utilizing data to improve clinical process and outcomes
- Establishing multi-stakeholder governance
- Marketing and communicating to diverse audiences
- Creating cultural alignment

**Never discourage anyone...
who continually makes progress,
no matter how slow.**

~ Plato

Questions?

Contact Information:

Rebecca Little
Senior Vice President
Medicity
rlittle@medicity.com
202-986-7364

Gina Perez
DHIN Project Director
Advances in Management, Inc.
gina@aim2bbest.com
302-645-1490

Sandy Phillips
National Coordinator HIE
Perot Systems
Sandy.Phillips@ps.net
770-367-0059