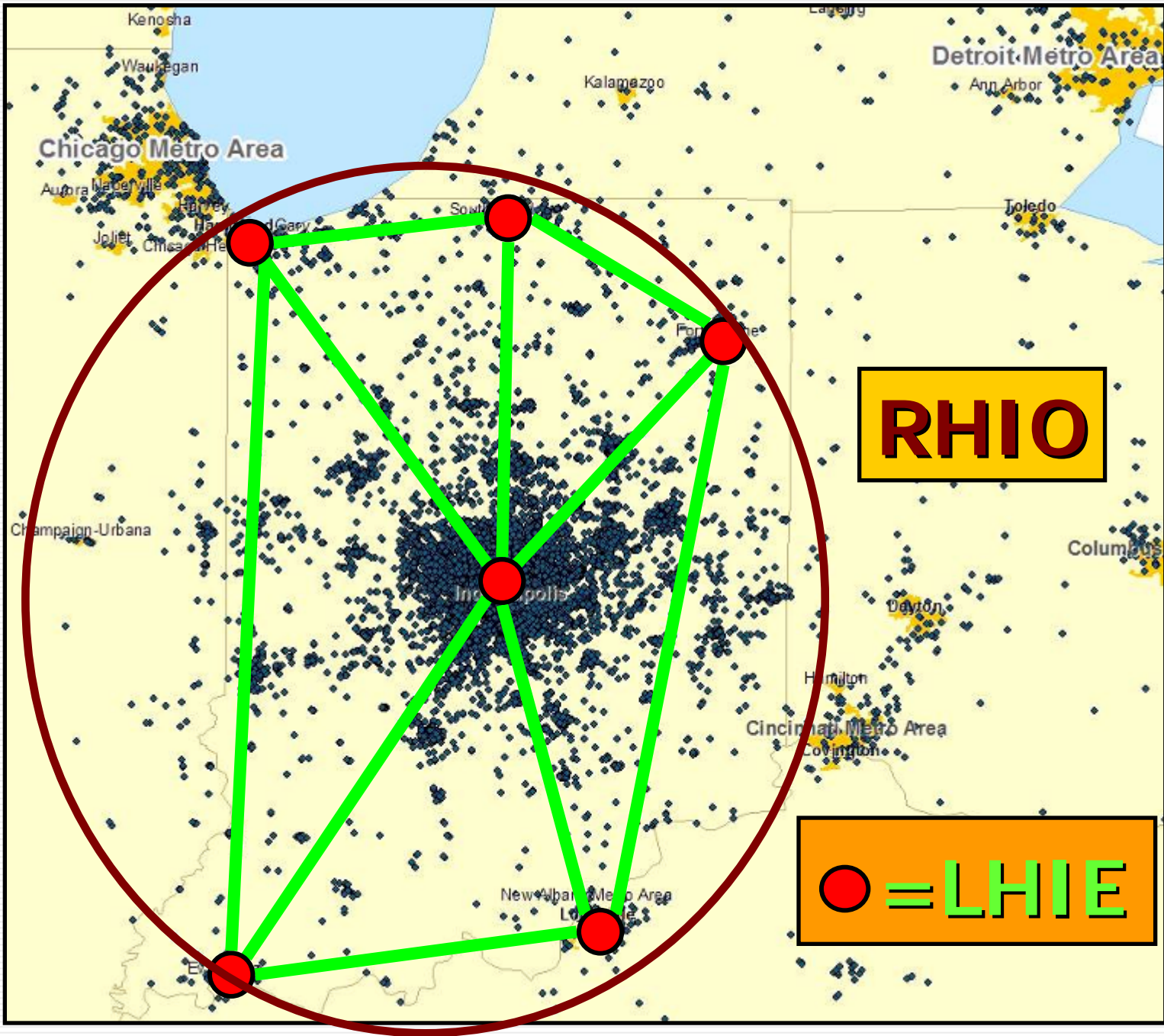


From Vision to Reality:

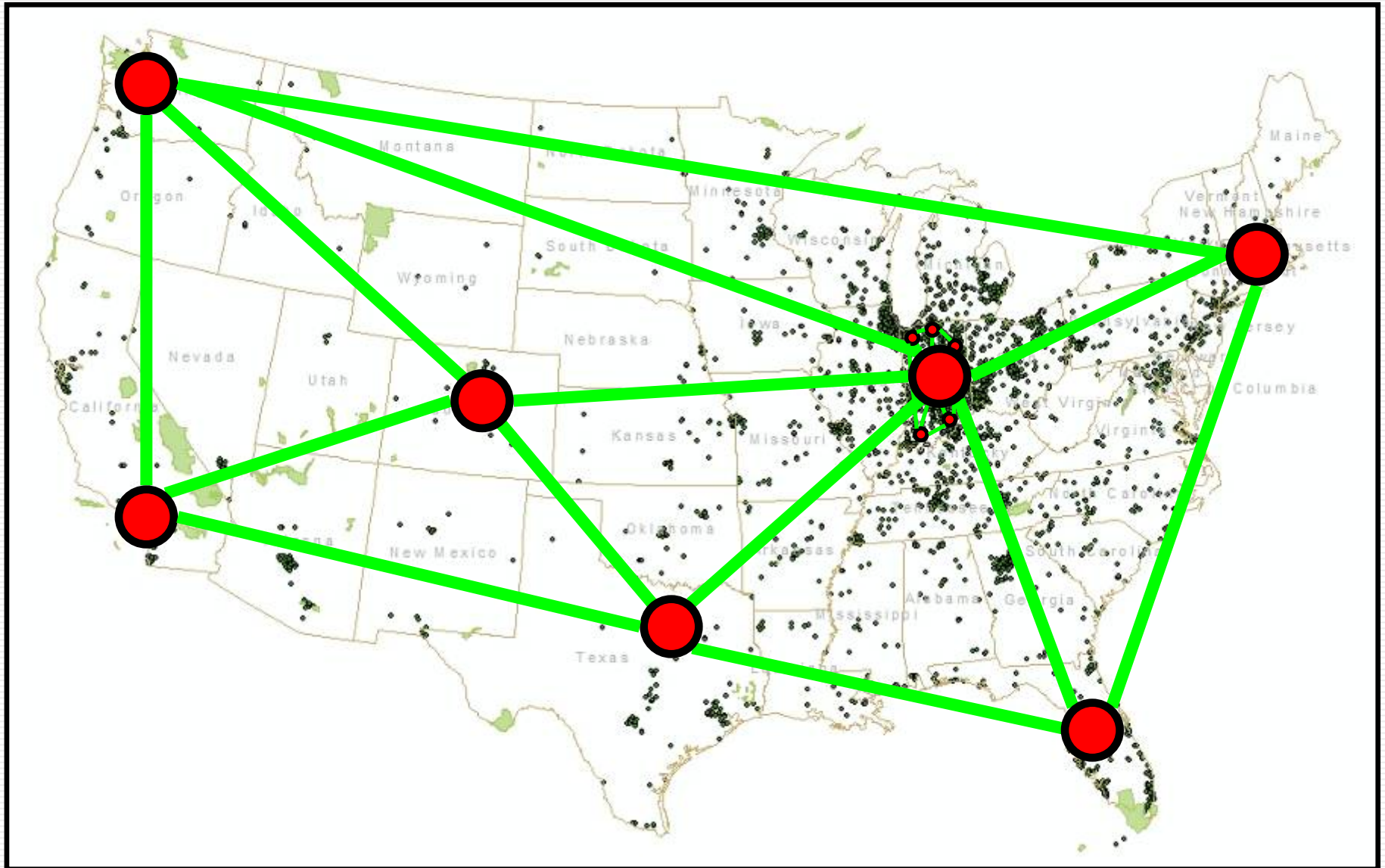
Real World Examples of Value from Health Information Exchange

Shaun Grannis, MD MS
Research Scientist, The Regenstrief Institute
Asst Prof, Dept of Family Medicine





NHII – A National Database





The Indiana Network for Patient Care (INPC)

An operational community wide
electronic medical record

Consolidating the Silos

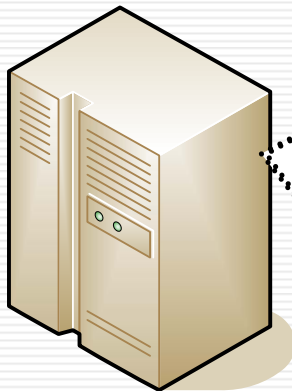


Immunization Registry

Jane Doe's Immunizations:

3/1/04	DipTetaPur	30936-9
3/1/04	HemInfB	30938-5
3/1/04	PolioVir	33555-4
3/1/04	HepaB	30937-7

DTaP Dose Count:	30936-9
HIB Dose Count:	30938-5
IPV Dose Count:	33555-4
VZV Dose Count:	30943-5
MMR Dose Count:	30940-1
HepB Dose Count:	30937-7



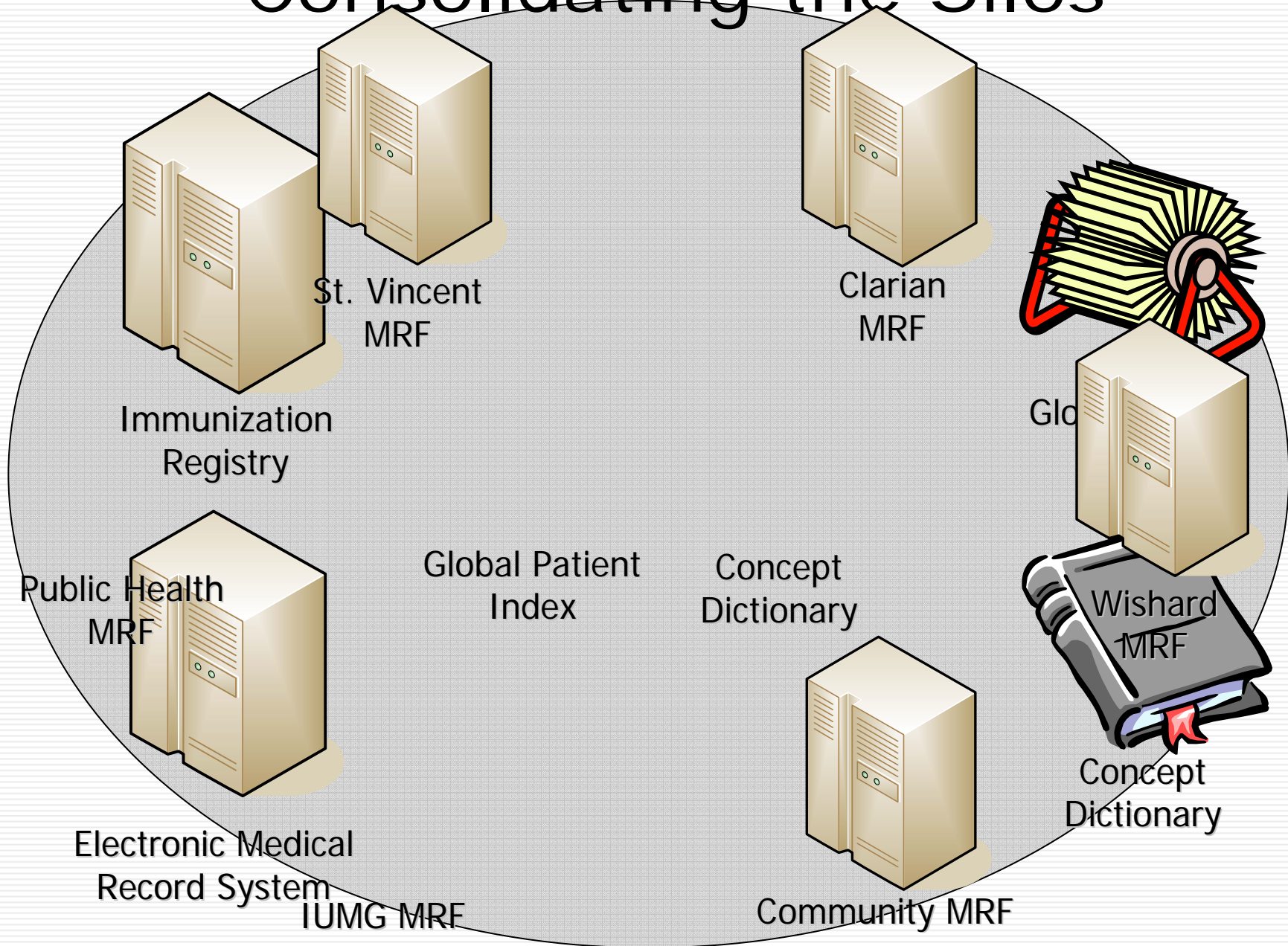
Electronic Medical Record System

Jane Ellen Doe's Shots:

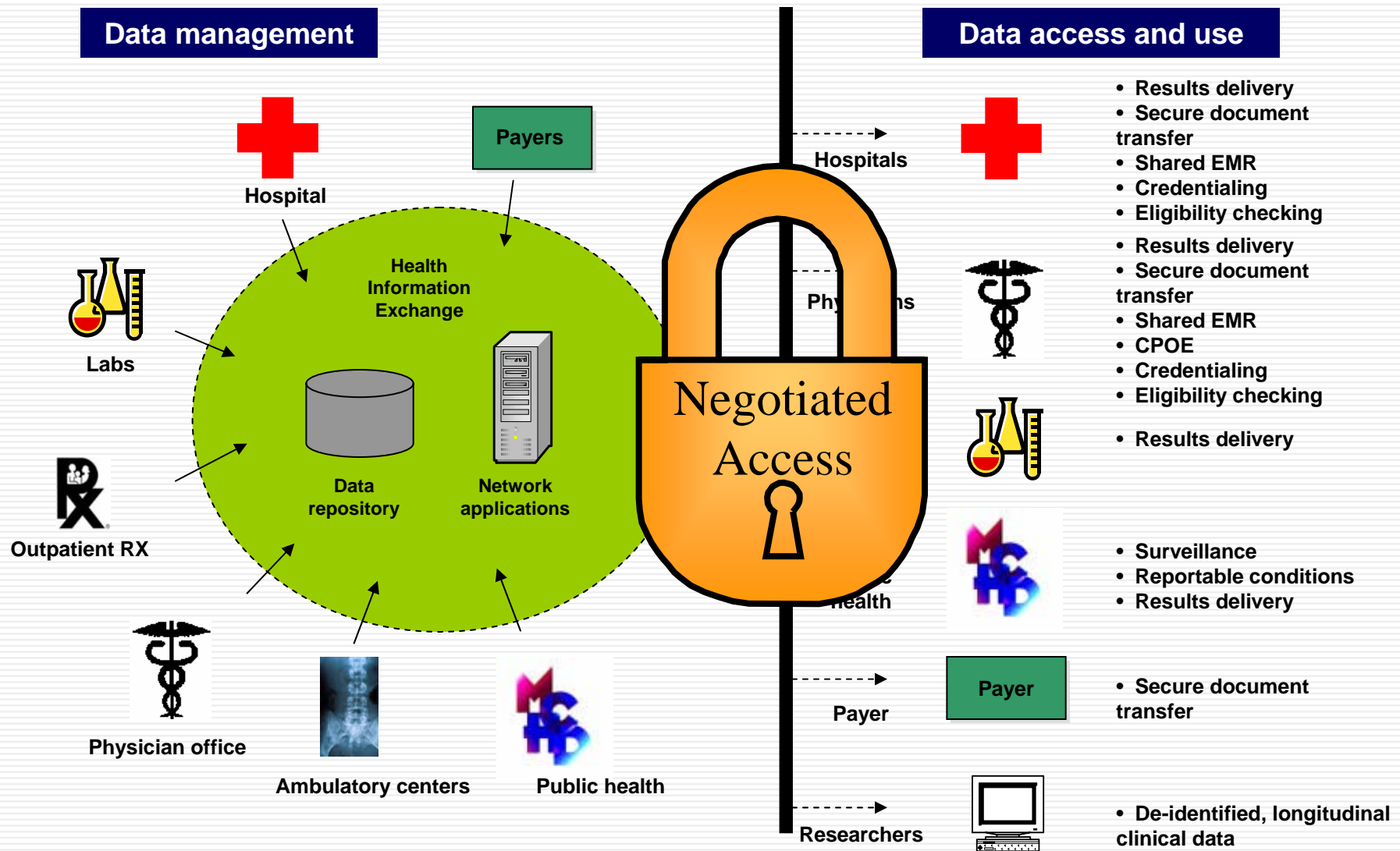
5/1/04	DTaP Imm	30936-9
5/1/04	HIB Imm	30938-5
5/1/04	IPV Imm	33555-4
7/9/04	DTaP Imm	30936-9
7/9/04	IPV Imm	33555-4

Global ID:	45128
Name:	Jane Ellen Doe
Lots of Demographics..	
MRF1 ID:	OU81247
MRF2 ID:	4564356
PH MRF ID:	123LMNOP
MRF3 ID:	6789XYZ

The Indiana Network for Patient Care Consolidating the Silos



Data Reuse



Community EMR



- Active Labs
- Flowsheet
- Clinical Synopsis
- REPORTS
 - ALL REPORTS
 - Admission/Discharge
 - Cardiology
 - Operative
 - Pathology
 - Radiology
 - Visit/Procedure Notes
 - Nurse/PA/PT/OT/Diet
 - Cytology
 - GI Procedures
- Face Sheet
- Appointment History
- Orders
- ENCOUNTERS
 - Brief
 - Detailed
- PRESCRIPTIONS
 - Inpatient
 - Outpatient
 - Surgery Log

ACA TESTS		1.5*H {m} †	1.8*H {n} †	1.2 {n} †	1.9*H {o} †	1.2 {o} †	Units
<input type="checkbox"/> Sgot	<input type="checkbox"/> Bili-tot						TS/L
<input type="checkbox"/> Lact	<input type="checkbox"/> Bili dir'		0.5*H {n} †	0.3 {n} †	1.1*H {o} †	0.7*H {o} †	o/L
<input type="checkbox"/> Ggtp	<input type="checkbox"/> Bili indir				0.8 {o} †	0.5 {o} †	TS/L
<input type="checkbox"/> Lipa:							TS/L
<input type="checkbox"/> Aca							
{ } - From							

BILIRUBIN:
 Bili-tot {m} - From Methodist Lab (SQLAB), 7/22/87 17:13
 Bili-dir' {n} - From Methodist Archive Lab, 7/22/87 17:13
 Bili-indir {o} - From WISHARD, 0879309-3 Y 7/22/87 17:13

<input type="checkbox"/> Bili indir	0.8 {o} †	0.5 {o} †	1.3*H {o} †	2.0*H {o} †	2.0*H {o} †	1.2*H {o} †	1.2*H {o} †	1.0*H {o} †	1.5*H {o} †	m

{m} - From Methodist Lab (SQLAB), 7/22/87 17:13
 {n} - From Methodist Archive Lab, 7/22/87 17:13
 {o} - From WISHARD, 0879309-3 Y 7/22/87 17:13

SMA12'	16-Aug-87 06:00	15-Aug-87 18:58	14-Jul-87 17:13	24-Mar-87 06:00	10-Mar-87 16:02	18-Dec-86 06:29	30-Nov-86 14:43	27-Oct-86 06:00	Units
<input type="checkbox"/> Albumin (sma)	3.2*L {p} †	3.6*L {p} †	3.4*L {p} †	3.1*L {p} †	4.2 {p} †	3.4*L {p} †	3.8 {p} †	3.9 {p} †	g/dL
<input type="checkbox"/> Alk phos (sma)	169*H {p} †	205*H {p} †	212*H {p} †	324*H {p} †	143*H {p} †	145*H {p} †	123 {p} †	122 {p} †	UNITS/L
<input type="checkbox"/> Bun (sma)	3*L {p} †	2*L {p} †	5*L {p} †	3*L {p} †	6*L {p} †	2*L {p} †	2*L {p} †	6*L {p} †	mg/dL
<input type="checkbox"/> Calcium (sma)	8.3*L {p} †	8.7 {p} †	8.4 {p} †	8.7 {p} †	9.1 {p} †	8.7 {p} †	9.2 {p} †	8.9 {p} †	mg/dL
<input type="checkbox"/> Chol (sma)	85*L {p} †	88*L {p} †	107*L {p} †	100*L {p} †	109*L {p} †	104*L {p} †	104*L {p} †	94*L {p} †	mg/dL
<input type="checkbox"/> Creat (sma)	0.5 {p} †	0.4 {p} †	0.6 {p} †	0.5 {p} †	0.4 {p} †	0.4 {p} †	0.3*L {p} †	0.5 {p} †	mg/dL

- Active Labs
- Flowsheet
- Clinical Synopsis
- REPORTS
 - ALL REPORTS**
 - Admission/Discharge
 - Cardiology
 - Operative
 - Pathology
 - Radiology
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- Appointment History
- Orders
- Encounters
 - Brief
 - Detailed
- PRESCRIPTIONS
- Inpatient
- Outpatient
- Advance Directives
- Surgery Log

Patient Medication History:

RxHub Patient Medication History Date: 12/07/2004

Patient Id: 2222
 Name: SCHNUR, BERT L
 Address: 63050
 DOB: 04/19/1945 Gender: Male

Medication History Date Range:
 12/08/2003 - 12/07/2004

DISCLAIMER: Certain information may not be available or accurate in this report, including over-the-counter medications, low cost prescriptions, prescriptions paid for by the patient or non-participating sources, or errors in insurance claims information. The provider should independently verify medication history with the patient.

Summary:

Drug Name	Oldest Fill Date	Most Recent Fill Date	#of Fills
DIGITEK 250 MCG TABLET	08/01/2003	08/01/2003	1
DIGITEK 125 MCG TABLET	02/01/2003	07/01/2003	3
LANOXIN 50 MCG/ML ELIXIR	04/01/2003	05/01/2003	2

Pharmacies:

Key Reported Pharmacies	Pharmacy Phone
1 ADVANCERX.COM	877-831-1324
2 WAL-MART #2514	651-456-6325

Key Reported Prescribers

A JEFFRIES, RHONDA

Detail Information:

Drug Name	Fill Date	Qty	Days	Prescriber	Pharmacy	Source
DIGITEK 250 MCG TABLET (DIGOXIN)	08/01/2003	30	30	A	2	RXHUBPBM
DIGITEK 125 MCG TABLET (DIGOXIN)	07/01/2003	30	30	A	2	RXHUBPBM
DIGITEK 125 MCG TABLET (DIGOXIN)	06/01/2003	30	30	A	2	RXHUBPBM
DIGITEK 125 MCG TABLET (DIGOXIN)	02/01/2003	30	30			RXHUBPBM

Results Delivery



Results Delivery – The Problem

- Clinical services are delivered in a broad variety of settings (ie, lab testing, transcription)
- Service providers (labs, transcription) bear the responsibility to deliver clinical information to caregivers practicing in many different environments
- The same physicians may receive data in inpatient, outpatient, and multiple clinic settings
- Current delivery methods are largely manual and inefficient

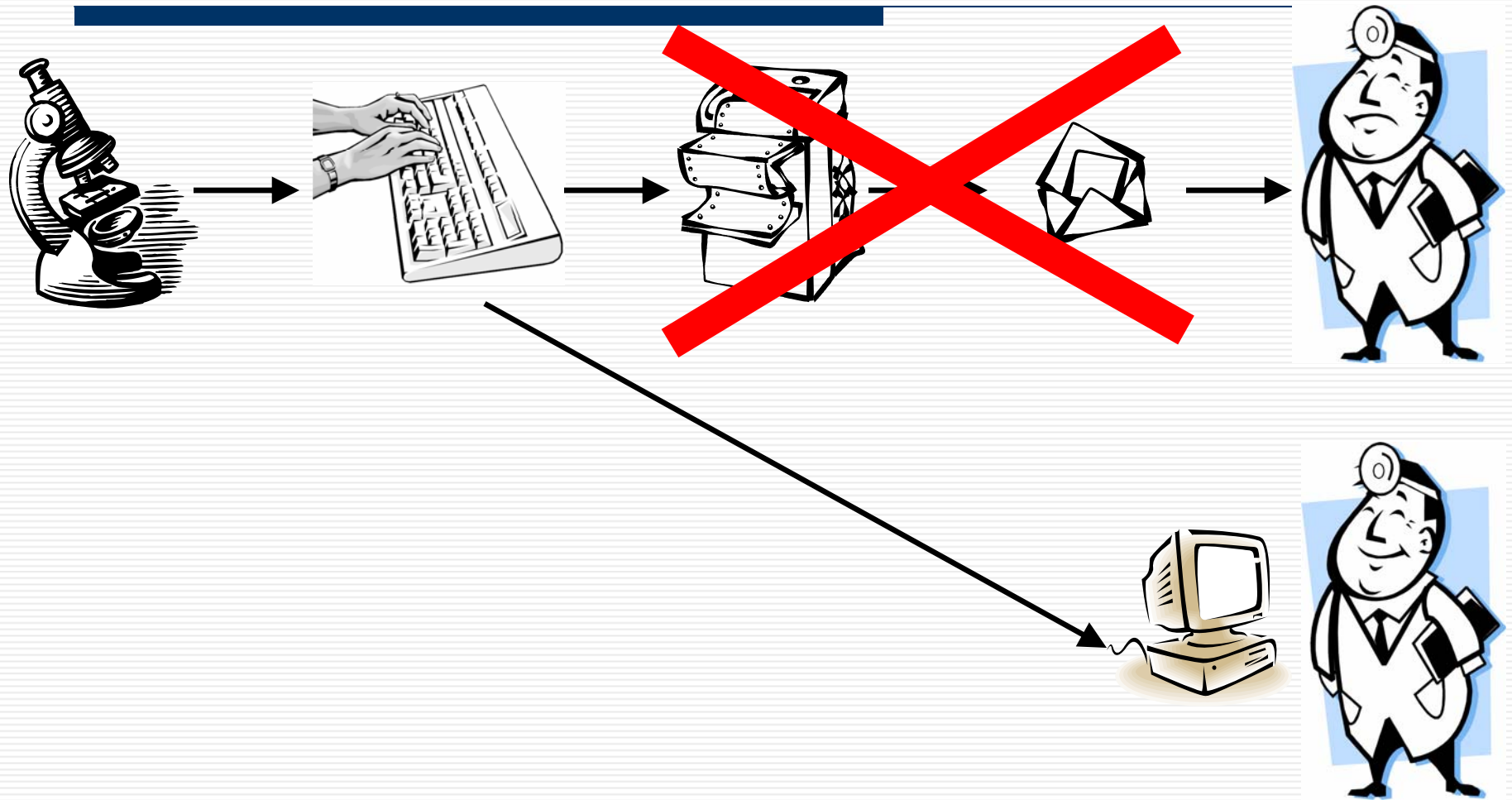


Results Delivery – An Example

- Laboratory generates a clinical result
 - Who needs to receive it?
 - Where does it need to be delivered?
 - What's the best way to deliver it?
- Most common approaches today all require human intervention:
 - snail-mail
 - fax
 - phone calls



Results Delivery – An Illustration



DOCS4DOCS®

Smiley, Amanda (Docs4Docs/ASMILEY)
Iumg - Pc Family Practice Center

General

- [Inbox](#)
- [Inbox History](#)
- [Report Search](#)
- [Change Password](#)
- [System Messages](#)
- [Help](#)
- [Logout](#)

Document INBOX

Holds all new documents.

Filters:

Actions:

	Provider	MRN	Patient Name	Arrival	Doc Type	Doc Details
<input type="checkbox"/>	Akosa Anthony N			2004 07/14 10:16 PM	Radiology (Clarian)	Xray Chest PA and Lateral
<input type="checkbox"/>	Akosa Anthony N			2004 07/14 10:16 PM	Radiology (Clarian)	Mammogram Screening Bilateral Digital DDI (Direct Digital Image)
<input type="checkbox"/>	Akosa Anthony N			2004 07/16 10:38 PM	Radiology (Clarian)	Xray Knee Standing
<input type="checkbox"/>	Akosa Anthony N			2004 07/16 10:38 PM	Radiology (Clarian)	Xray Foot 2 Views
<input type="checkbox"/>	Akosa Anthony N			2004 07/16 10:28 PM	Radiology (Clarian)	Xray Knee 3 Views
<input type="checkbox"/>	Akosa Anthony N			2004 07/14 10:16 PM	Radiology (Clarian)	Xray Chest PA and Lateral
<input type="checkbox"/>	Akosa Anthony N			2004 07/16 10:28 PM	Radiology (Clarian)	MR Brain - Head - Without then With Contrast
<input type="checkbox"/>	Akosa Anthony N			2004 07/08 03:11 PM	Radiology (Clarian)	Xray Abdomen KUB
<input type="checkbox"/>	Akosa Anthony N			2004 07/19 10:44 PM	Radiology (Clarian)	Xray Elbow
<input type="checkbox"/>	Akosa Anthony N			2004 07/13 10:26 PM	Radiology (Clarian)	Xray Hand Min 3 Views
<input type="checkbox"/>	Akosa Anthony N			2004 07/15 10:37 PM	Radiology (Clarian)	Xray Chest PA and Lateral
<input type="checkbox"/>	Akosa Anthony N			2004 07/16 10:27 PM	Radiology (Clarian)	Xray Wrist AP and Lateral
<input type="checkbox"/>	Akosa Anthony N			2004 07/09 03:36 PM	Radiology (Clarian)	US Renal
<input type="checkbox"/>	Allen Deborah I			2004 07/12 05:31 PM	Radiology (Clarian)	Xray Spine Scoliosis AP and Lateral

DOCS4DOCS®

Smiley, Amanda (Docs4Docs/ASMILEY)
Iumg - Pc Family Practice Center

INBOX Review

General

- Inbox
- Inbox History
- Report Search
- Change Password
- System Messages
- Help
- Logout

Navigation:

Actions:



Clarian Health Partners
1701 North Senate Boulevard
P.O.Box 1367
Indianapolis, IN 46206-1367

Radiology Consultation Report

Exam: Xray Chest PA and Lateral

Exam Data: Pt Name: DOB: Sex:

Exam Time: MRN: Pt Location: Out Patient

Accession: Pt Class:

Report To: Akosa Anthony N Ordered By: Akosa, Anthony N

EXAMINATION: PA AND LATERAL CHEST,

COMPARISON:

INDICATION: Cough, hypertension.

FINDINGS: Lung volumes are normal. There are diffuse bilateral infiltrates, which may represent diffuse infection, extrinsic allergic alveolitis, alveolar proteinosis or other etiologies. Clinical correlation is recommended. There is no pneumothorax or pleural effusion. Heart size and mediastinum are within normal limits.

IMPRESSION:

Diffuse bilateral infiltrates which may reflect the disease processes noted on other

Results Delivery – A Solution

- Replace current manual processes, consolidate work in automated fashion within HIE
- Engages physician practices directly
- Incremental step towards moving providers into information-based practice



Results Delivery – Who Benefits

- The service providers and others who are responsible for delivering clinical results benefit by reducing results delivery costs
- Providers benefit by receiving results in a consolidated, more timely fashion
- The HIE can deliver this service more effectively at lower cost:
 - Results delivery costs may be reduced by 40-50%
 - A service provider who delivers 1 million results a year may save up to \$400K.



Medication Reconciliation

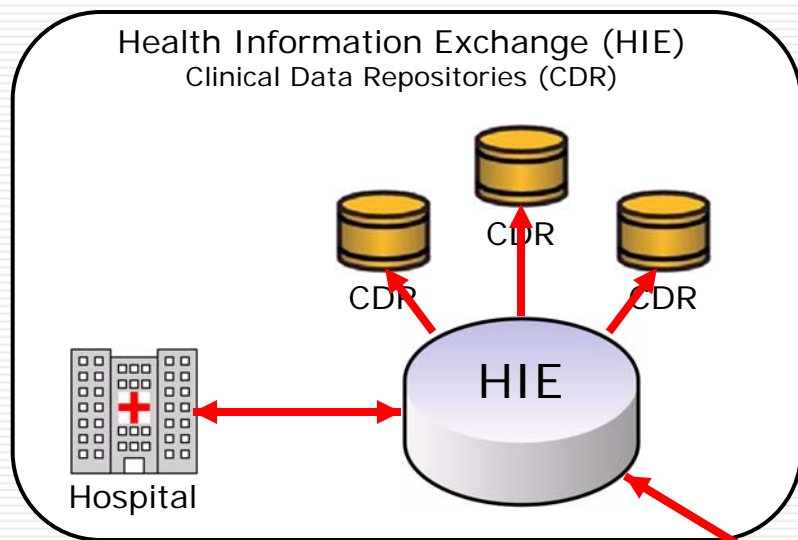


Medication Reconciliation – The Problem

- An estimated 770,000 people are injured or die each year in hospitals from adverse drug events (ADEs)
- Over half of all hospital medication errors occur at transitions of care (eg, outpatient to inpatient)
- ADE's may cost up to \$5.6 million each year per hospital depending on hospital size.



Medication History – An Example

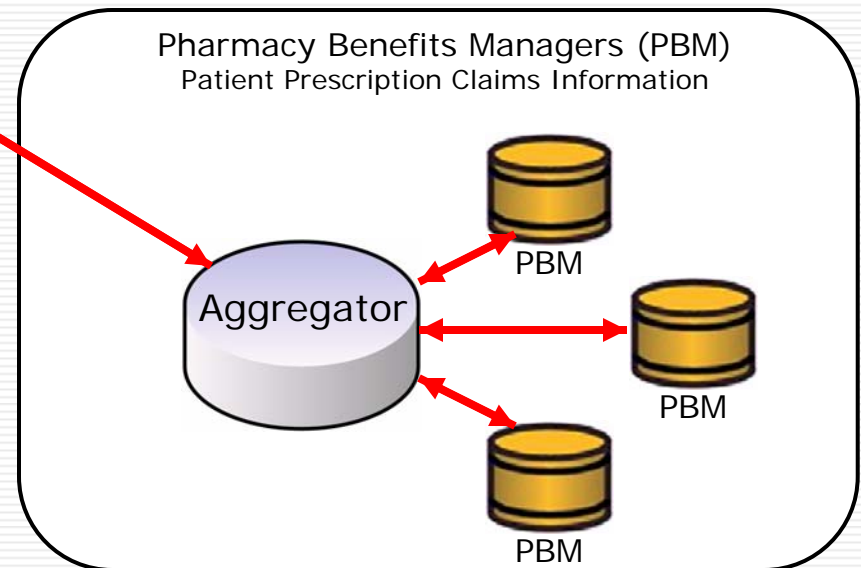


Health Information Exchange Medication Reconciliation Process

1. Patient is admitted and appropriate consent is obtained
2. Hospital requests medication history through local health information exchange
3. Health information exchange queries multiple clinical data repositories (CDR's), including medication data thru pharmacy benefits manager (PBM) aggregator.
4. Patient medication history received from aggregator.
5. Medication data is reviewed with patient; care is informed by medication history

Pharmacy Medication Aggregation

1. Patient medication history request received from health information exchange
2. Aggregator compiles medication history from multiple PBM's and responds back to the health information exchange



Medication Reconciliation – A Solution

- Health information exchange can automatically query medication history data sources and proactively assist with medication reconciliation
- Process can be integrated with existing patient registration workflow
- Can be implemented across an entire community/region



Medication Reconciliation - Who Benefits

- Patients/Clinicians
 - Improved patient safety through reduced drug duplications and adverse events
 - Ability to establish and monitor clinically appropriate drug therapy and patient adherence to treatment programs
- Hospitals:
 - Improve efficiency for health care organizations required to perform JCAHO recommended medication reconciliation
 - Potential reduction in care costs



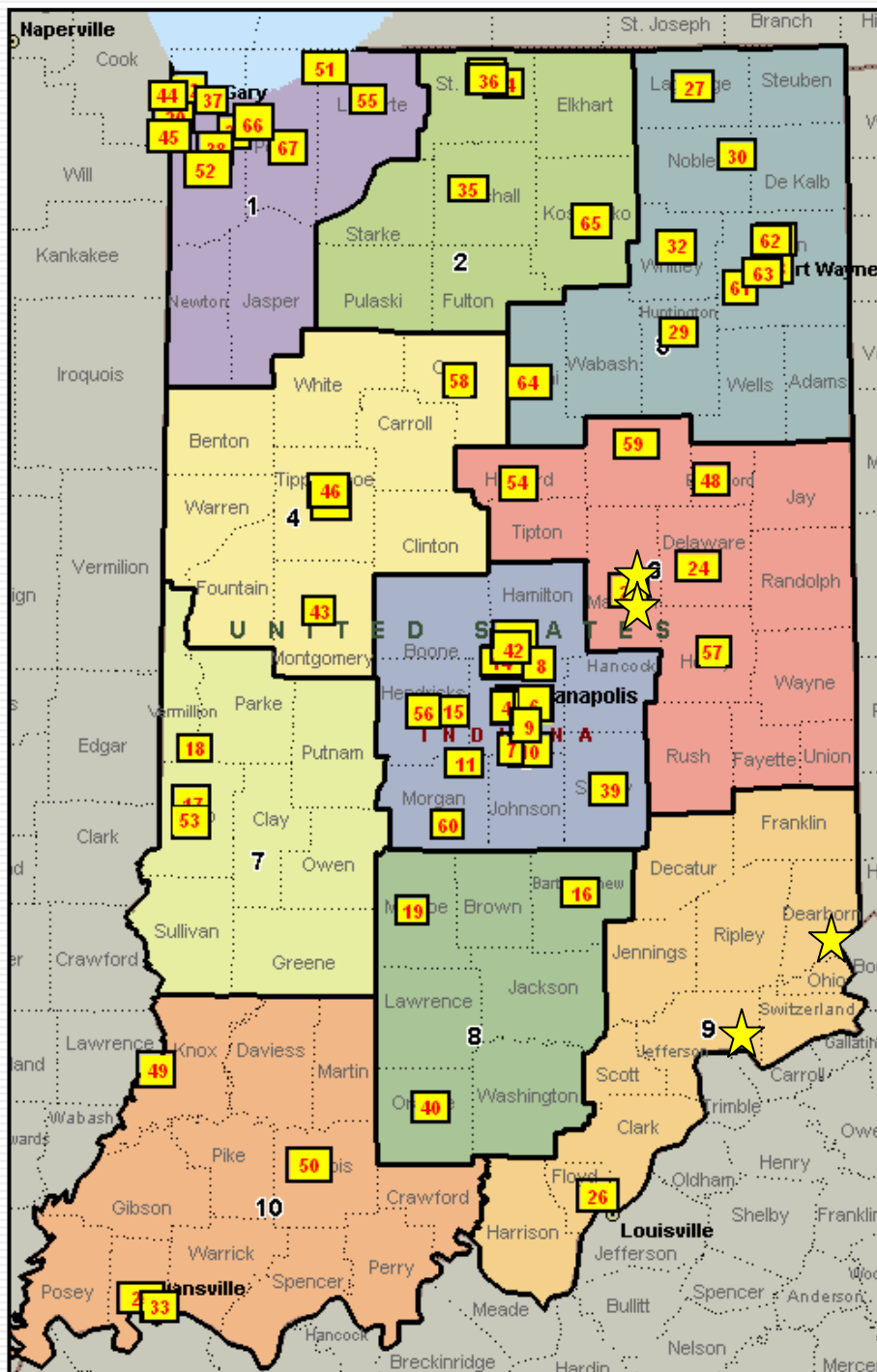
Medication History – The Value

- Estimated costs for JCAHO recommended medication reconciliation on the order of \$50-\$75 per admission
- Electronic medication history data may reduce these costs by 25% or more
 - At a savings of \$18.75 per patient, a hospital that admits 2,000 patients could save \$37,500 in increased efficiency.



Public Health Value





Current PHESS Hospitals (n=68)

★ = in progress

> 5,000 visits per day
 ~ 15 MB data per day

Goal of 79 hospitals
 by August 2007

No Change in Workflow

- Since PHESS requires information that is already being collected by the registration system, there is
 - no change in work flow, (unless chief complaint is not currently captured)
- The only upfront work involved is setting up connectivity and an HL7 interface.
 - On average it takes approximately 11 hours of a network engineer and interface programmer's time for this project
 - Record go live time set on 3/6/2006 – under 3 hrs

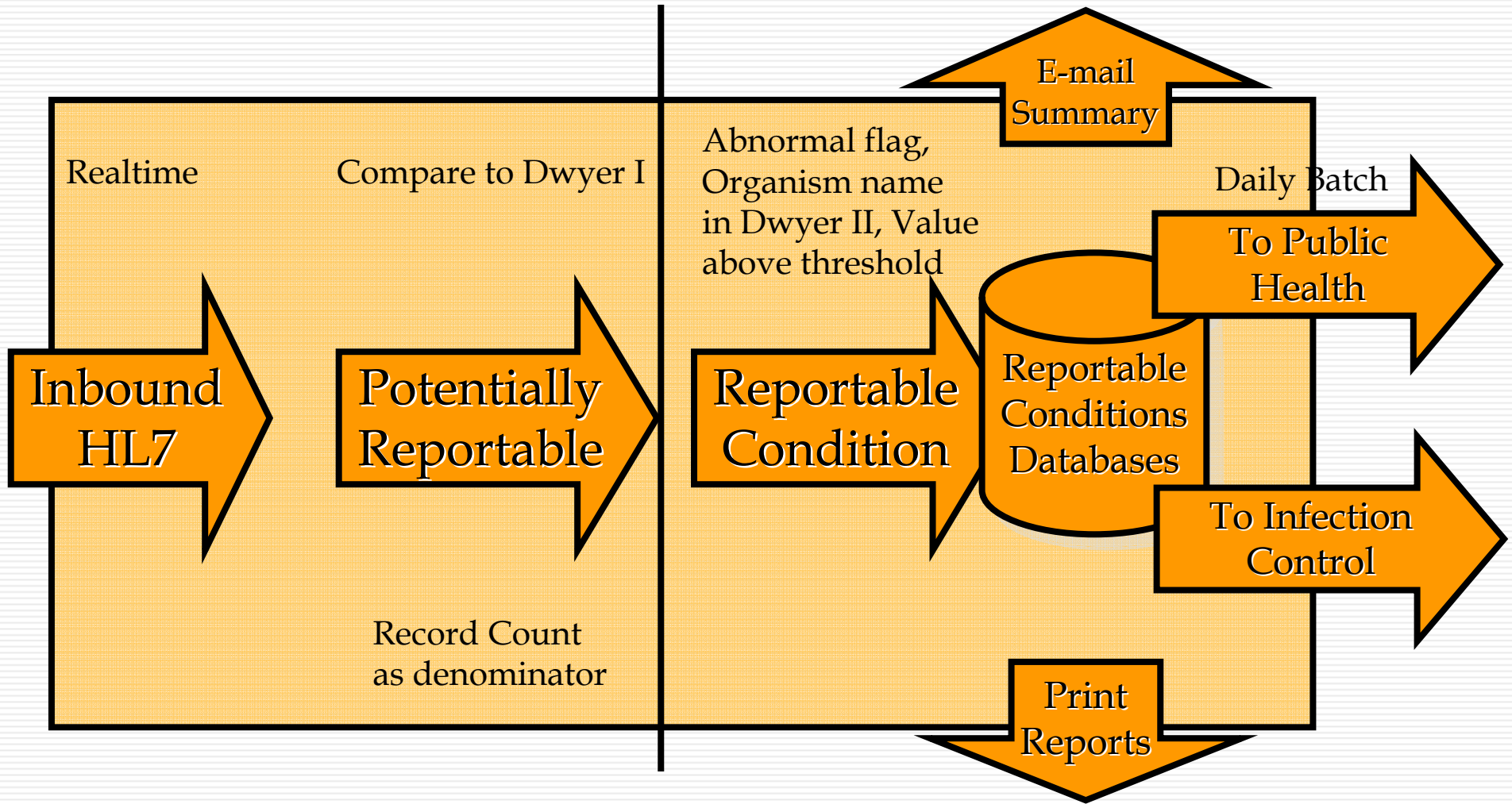


Electronic Lab Reporting

- Reportable disease HL7 messages are sent to ISDH and Marion County Health Department daily.



Reportable Condition Processor



Public Health Reportable Diseases

12:00 AM TO 03:00 PM 12:00 AM TO 11:59 PM 12:00 AM TO 11:59 PM 12:00 AM TO 11:59 PM

Cases Cases Cases Cases Condition

GENERAL INFECTION:

1	1	0	0	Enterococcus, Vancomycin-resistant
3	1	0	6	Staphylococcus, Methicillin-resistant
0	2	4	2	Giardiasis
0	1	0	0	Hepatitis A

STD:	7	29	7	16	Chlamydia infection
	1	0	0	5	Genital warts
	2	9	2	6	Gonorrhoea
	0	2	1	0	Herpes simplex
	1	0	5	2	Syphilis
	0	0	1	2	Trichomoniasis

0	2	1	0	Herpes simplex
1	0	5	2	Syphilis
0	0	1	2	Trichomoniasis

VACCINE PREVENTABLE:

2	3	2	1	Chickenpox
2	1	0	0	Haemophilus influenzae
3	0	1	0	Measles
0	0	3	0	Pertussis
0	0	0	1	Poliomyelitis
0	0	1	0	Rubella

LEAD: 10 58 10 14 Lead exposure

POISONINGS: 3 5 2 1 Carboxyhemoglobin levels

RESPIRATORY: 0 1 0 0 Fifth's disease

TB: 1 0 1 1 AFB Undetermined

MRF_RRD_DISPLAY - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print Mail News RSS Feeds

4 years [CLARIAN] GRANNIS, SHAUN

Select a patient Browse Patient Record Other Browse Patient Record»Chronologic Results -- All Results

Hide Menu First page Previous page Next page Sort by posting date Sort by observation date Praxis Logout Help Print

Chronologic Results -- All Results

Flowsheet
Clinical Synopsis
REPORTS

ALL REPORTS
Admission/Discharge
Cardiology
Operative
Pathology
Radiology
Visit/Procedure Notes
Nurse/PA/PT/OT/Diet
Cytology
GI Procedures
Letter/Form/Consent
Face Sheet

ENCOUNTERS
Brief
Detailed

26-Jun-03 01:07	-2.97 Years	HOSP ABSTRACT	Updated: 26-Jun-03 02:22	
24-Jun-03 22:24	-2.97 Years	HOSP ABSTRACT	Updated: 24-Jun-03 22:25	
HOSP FACILITY MH {a}				
ATTENDING MD EMERGENCY SERVICES,M {a}				
ADMITTING MD EMERGENCY SERVICES,M {a}				
{a} From Cerner ADT				
23-Jun-03 00:26	-2.98 Years	HOSP ABSTRACT	Updated: 23-Jun-03 00:31	
HOSP FACILITY MH {a}				
ATTENDING MD EMERGENCY SERVICES,M {a}				
ADMITTING MD EMERGENCY SERVICES,M {a}				
{a} From Cerner ADT				
24-Mar-03 14:01	-3.22 Years	LEAD LEVEL	Updated: 25-Mar-03 10:40	01M55689LEADBL
LEAD LEVEL <3 {a} MCG/DL				
{a} From Clarian Lab (SQLAB2)				
{b}				
{a} From Clarian Lab (SQLAB2)				
{b} From Methodist Lab (SQLAB)				
12-Dec-01 09:40	-4.5 Years	NEWBORN SCREEN REP	Updated: 27-Dec-01 12:21	Final 94780940H10829NBSEDR
NEWBORN SCN FOLLOW-UP FOLLOWING SCREENING TESTS WITHIN ACCEPTABLE LIMITS:				
PHENYLKETONUREA MAPLE SYRUP URINE DISEASE				
HOMOCYSTEINURIA GALACTOSEMIA HEMOGLOBINOPATHIES				
HYPOTHYROIDISM CONGENITAL ADRENAL HYPERPLASIA				
BIOTINIDASE DEFICIENCY				
performed at The Newborn Screening Laboratory, IU				
Medical Center {a}				
SCREEN 14 ACCEPTABLE RANGE IS 5.0 TO 25.0				
MCG/DL {a}				
{b}				
{a} From Clarian Lab (SQLAB2)				
{b} From Methodist Lab (SQLAB)				

Done Internet



From Vision to Reality:

Real World Examples of Value from Health Information Exchange

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Research Scientist, The Regenstrief Institute
Asst Prof, Dept of Family Medicine

