

Incorporation of Laboratory Results into Statewide Hospital Data

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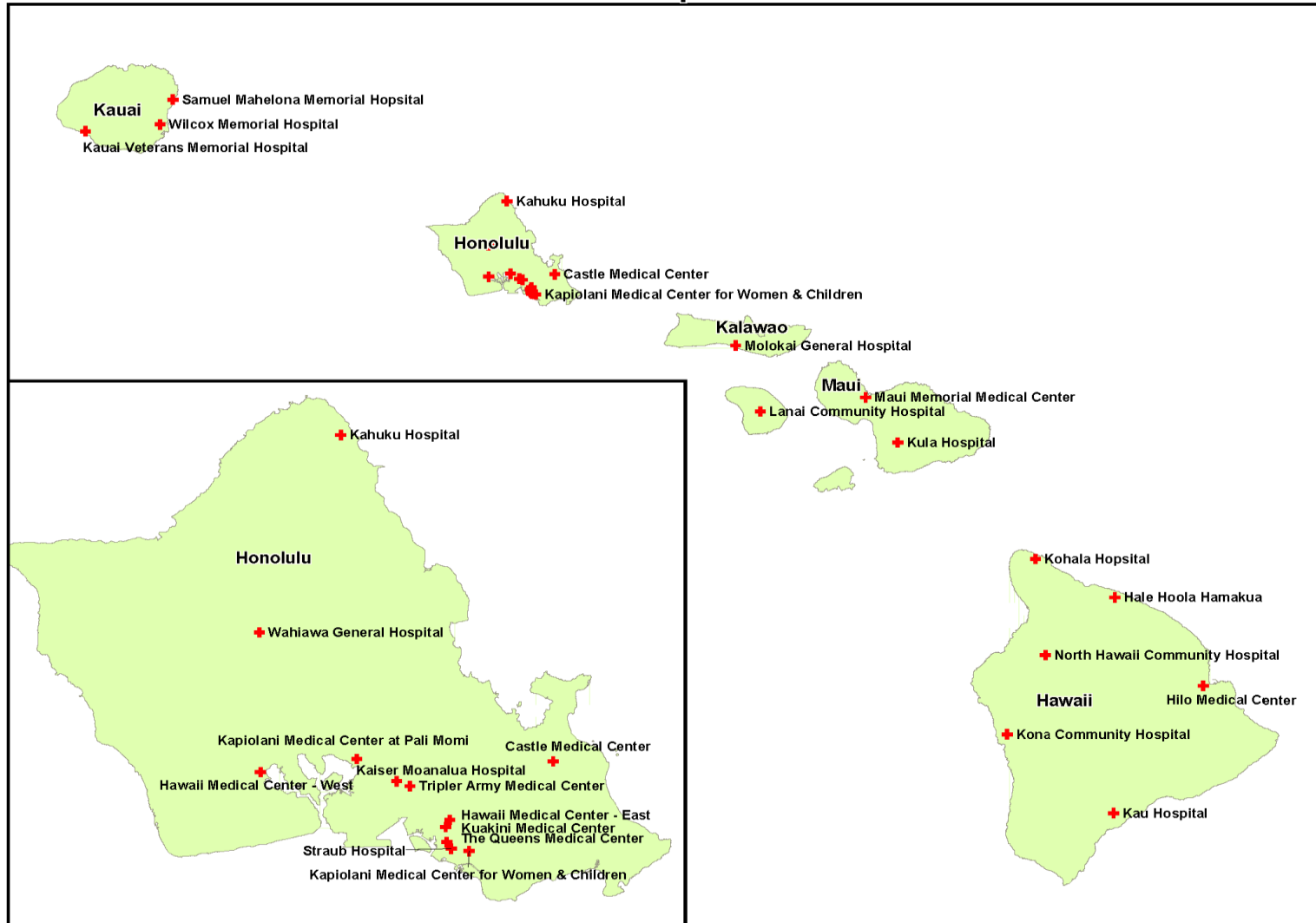
RATIONALE FOR ADDING CLINICAL DATA

- Adding limited clinical data elements improves quality assessment using administrative data
- Important, cost-effective additions
 - POA
 - Lab values on admission
 - (maybe) vital signs

HAWAII HEALTH INFORMATION CORPORATION

and

Hawaii Hospitals



LARGE ADMINISTRATIVE DATABASES

Administrative, or Billing Data

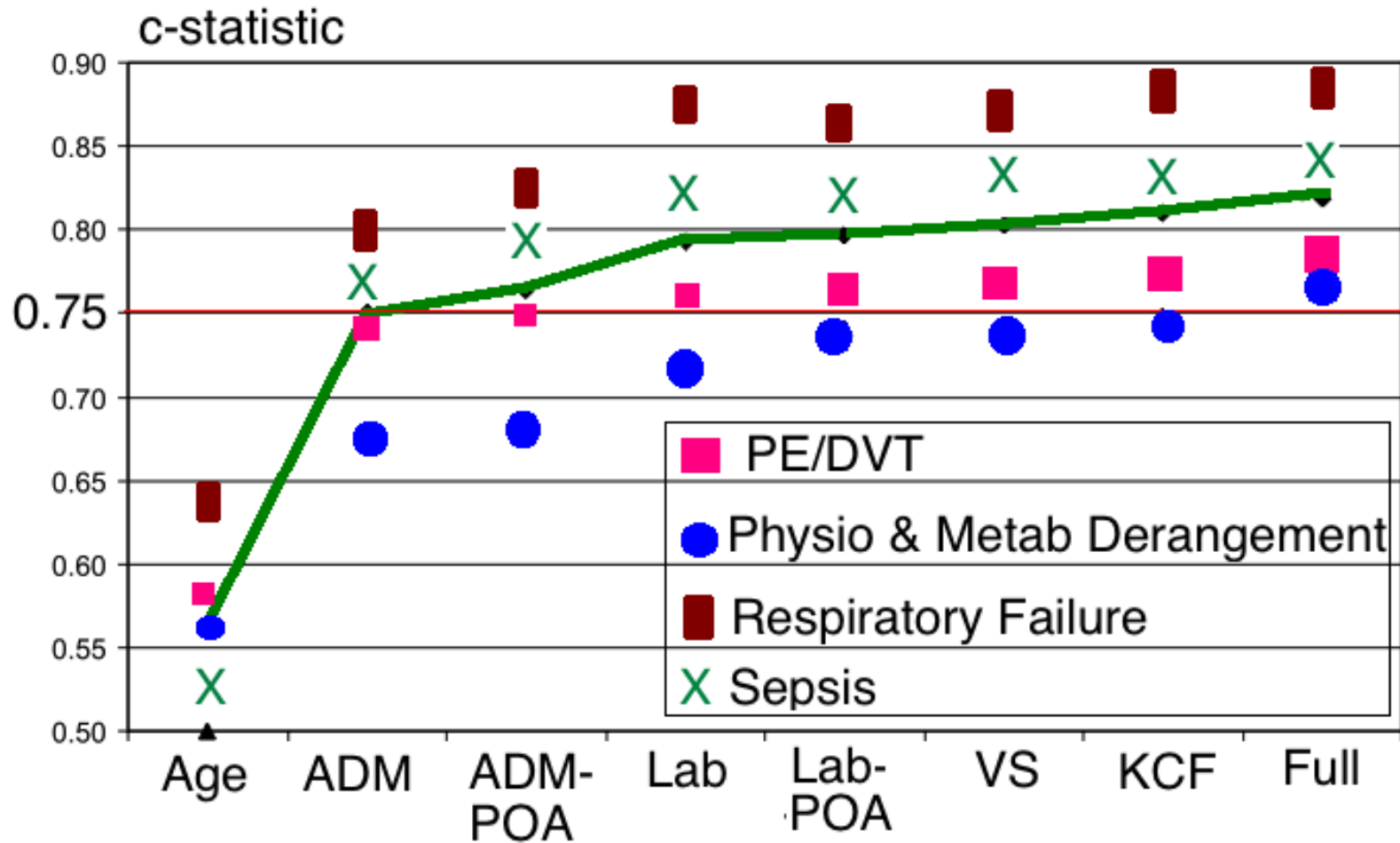
UB-92 (UB-04) Billing Form

1 PATIENT CONTROL NO.		4 TYPE OF BILL 111
5 FED TAX NO.		6 STATEMENT COVERS PERIOD FROM 19961222 TO 19981222
7 COV D.		8 INC D.
9 C-ID.		10 L-R D.
11		
12 PATIENT NAME 3055758833		13 PATIENT ADDRESS
14 BIRTHDATE 01 20040226 05 20040226		15 SEX M
16 DATE OF ADMISSION 17 DATE 08 18 HR 3 19 TYPE 1 20 SRC 01		21 D HR 16 22 STAT 01
23 MEDICAL RECORD NO.		24 03 25 04 26 05 27 06 28 07 29 08 30 09
32 OCCURRENCE DATE CODE 01 20040226 02 05 20040226 06		34 OCCURRENCE DATE CODE 03 20040226 07
36 OCCURRENCE DATE CODE 04 20040226 08 10 20040226 10		37 OCCURRENCE SPAN FROM THROUGH A DDDDDDDDDDDDDDDDDDDDD B C C
38 INSURANCE COMPANY		39 VALUE CODES AMOUNT a 01 12.99 b 04 12.99 c 07 12.99 d 10 12.99
40 VALUE CODES AMOUNT 02 12.99 05 12.99 08 12.99 11 12.99		41 VALUE CODES AMOUNT 03 12.99 06 12.99 09 12.99 12 12.99
42 REV CD	43 DESCRIPTION	44 HCPCS / RATES
1 272	Morphine sulfate injection	J2275
2 250	Abdmal drssng holder/binder	A4462
3 258	Abdominal pad	L1270
4 270	Local/topical anesthetics	A4735
5 300	Apnea monitor	E0608
6 280		
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23 0001		

- Demographics (age, sex)
- Diagnoses & procedures (ICD-9-CM, DRG)
- POA
- Expected payer
- Length of stay
- Patient disposition
- Admission source & type
- Admission month
- Charges

PREDICTIVE ACCURACY

Adding Laboratory

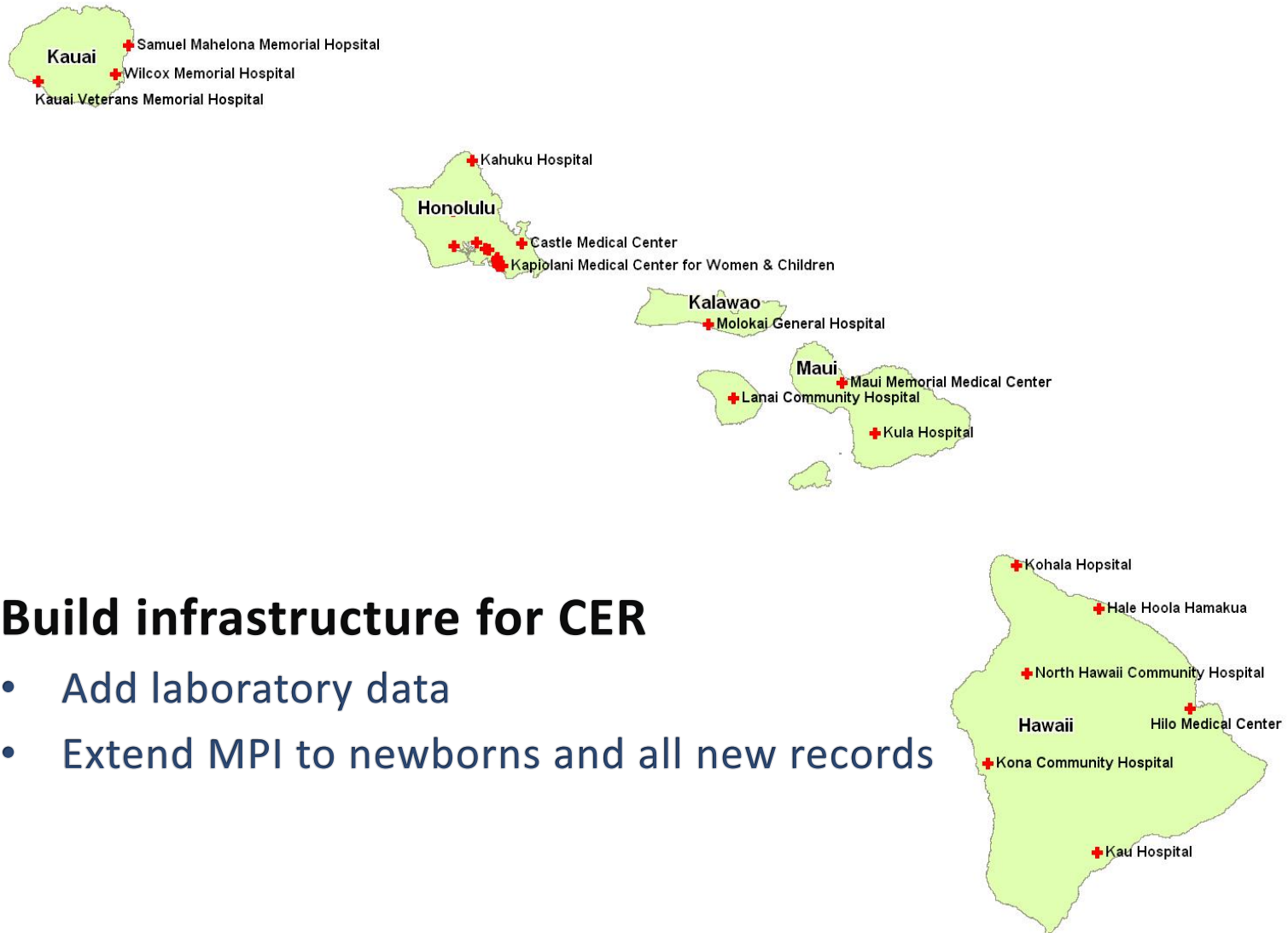


ADMISSION LABS

Category	Lab Tests		
Chemistry	Albumin	Creatinine	Sodium
	Alkaline phosphatase	Glucose	Troponin I
	Blood urea nitrogen (BUN)	Gamma glutamyl transferase	SGOT
	Calcium	Potassium	SGPT
	Chloride	Phosphate	Bilirubin
	Creatine kinase-MB	BNP	
Blood Gas	pO ₂	pH	Bicarbonate
	pCO ₂	Base Excess	
Hematology	Hemoglobin	Partial thromboplastin time (PTT)	Platelet Count
			Prothrombin Time (PT)
	Hematocrit	INR	White blood count (WBC)
Microbiology	Blood Culture	Urine Culture	Sputum Culture



Hawaii Hospitals



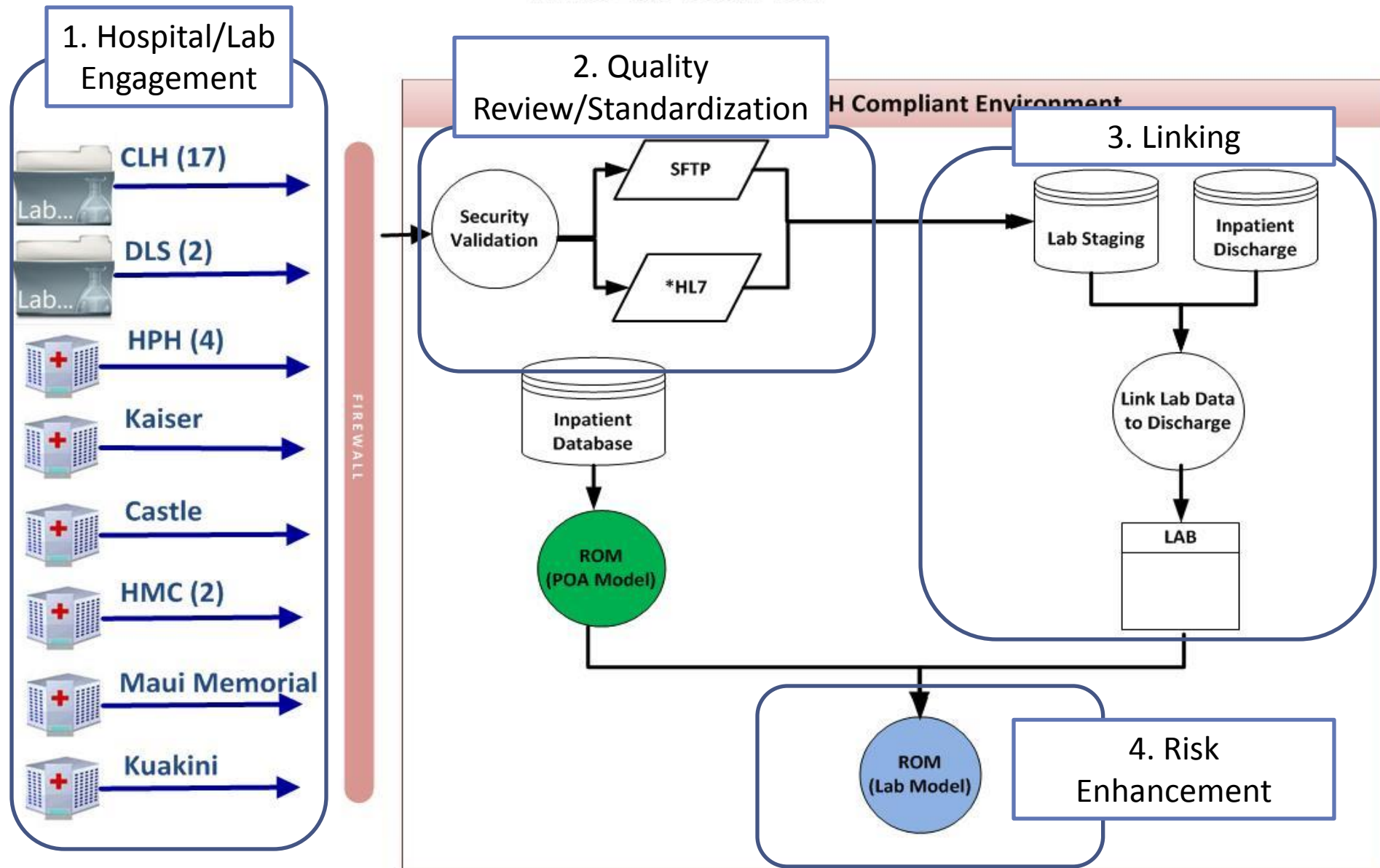
Build infrastructure for CER

- Add laboratory data
- Extend MPI to newborns and all new records



DATA TRANSFORMATION

HHIC Lab Data Flow



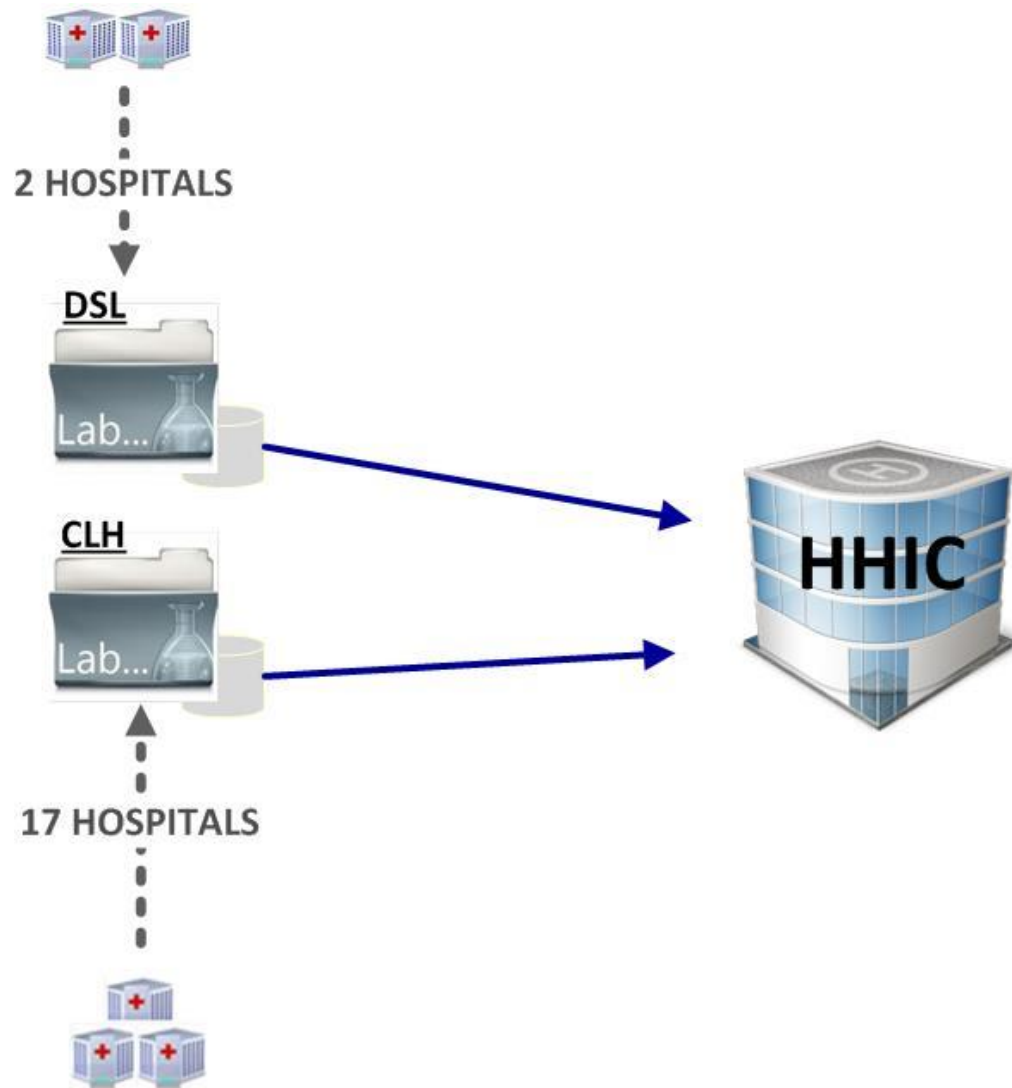
KEY DATA SOURCES – As Conceived



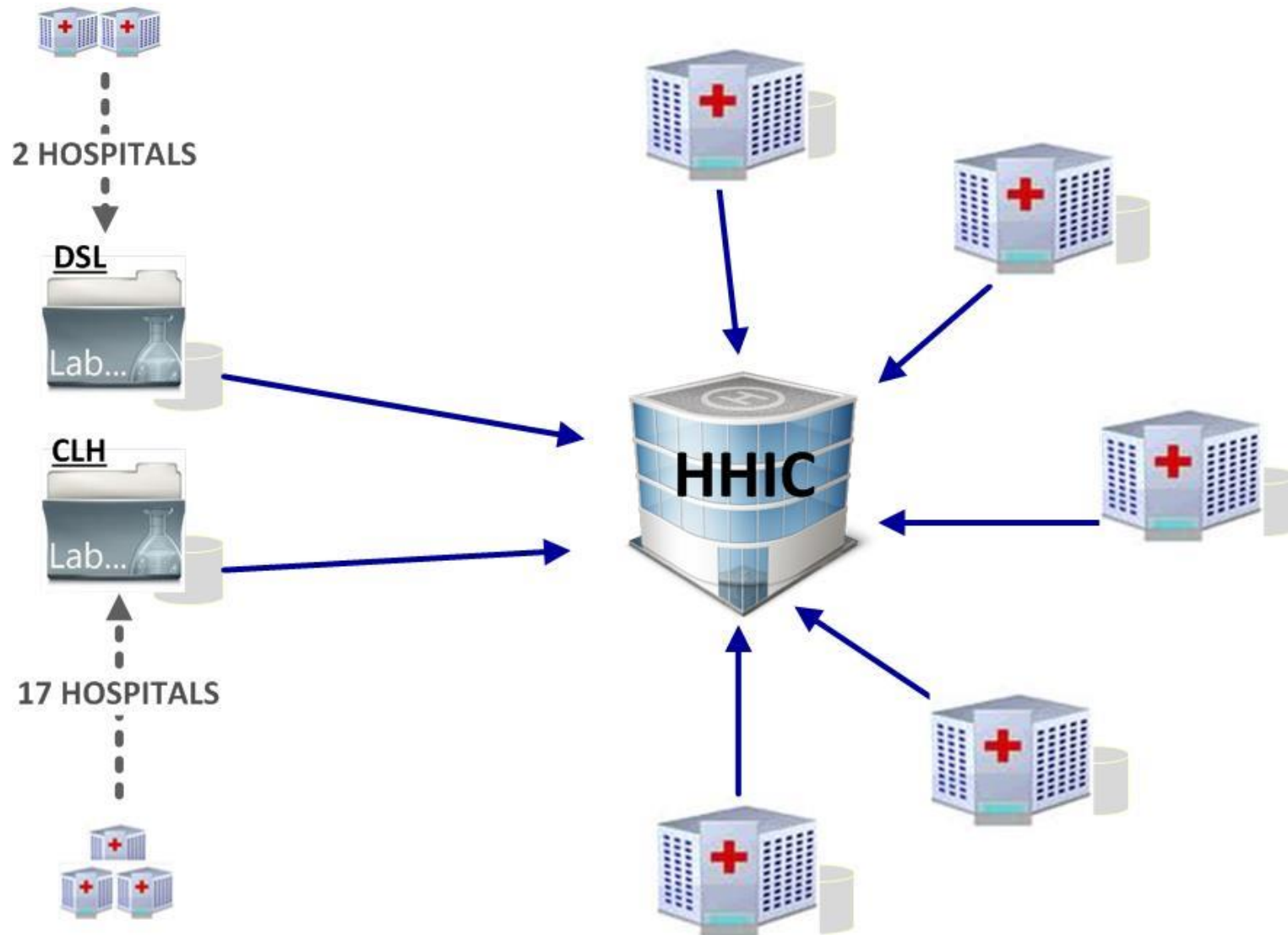
KEY DATA SOURCES – As Conceived



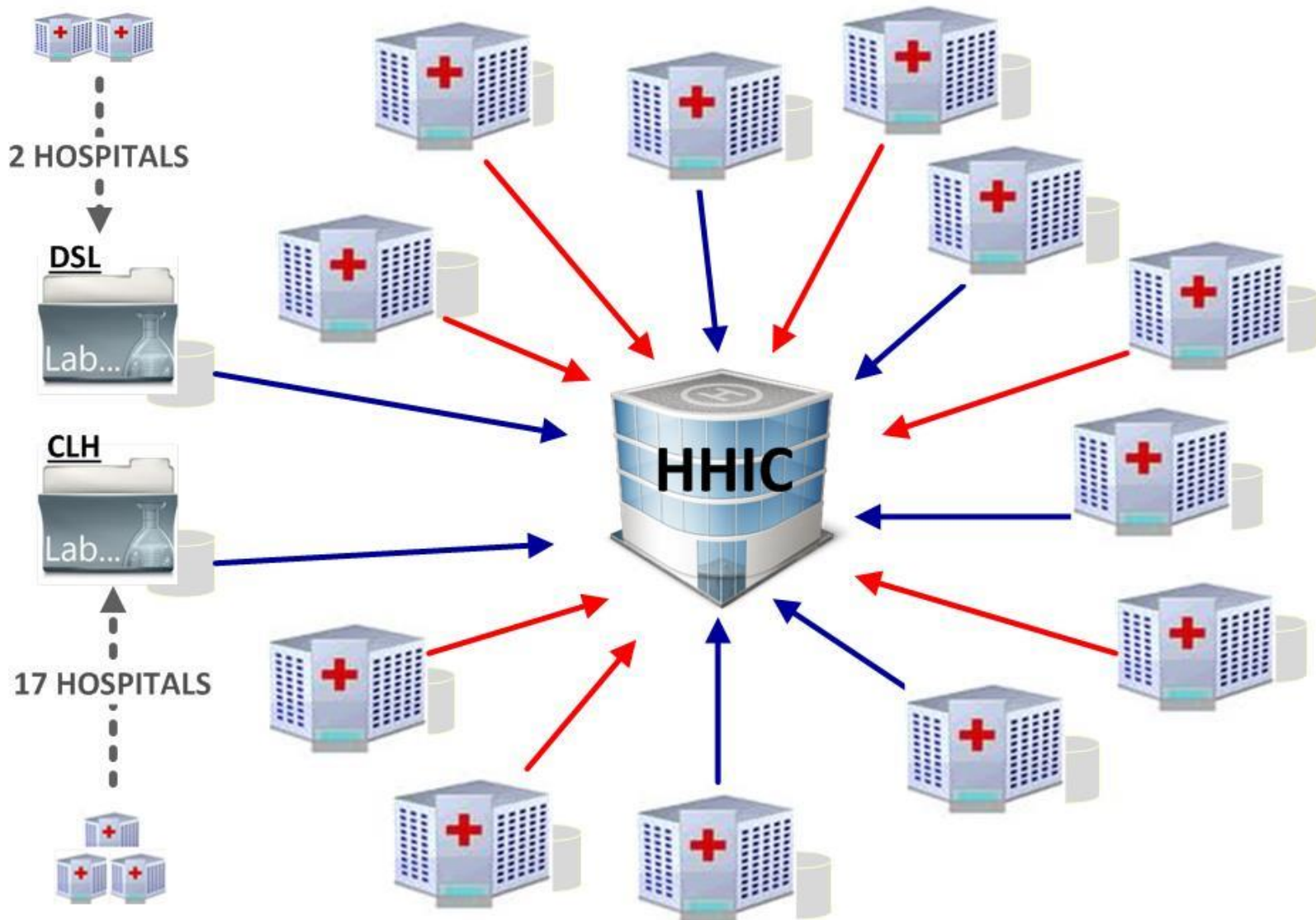
KEY DATA SOURCES – As Conceived



KEY DATA SOURCES – As Conceived



REALITY!!



DATA STANDARDS

Established Data Specifications

Lab Data Transmission – Data Elements	
*Sending Facility	Receiving Application
*Account Number	Create Date/Time
*Medical Record Number	Patient Class
*DOB	Hospital Test (Order)
Gender	Hospital Test Result (LOINC)
*SSN	Observation Date/Time
*Patient First Name	Results Report/Status Change
*Patient Last Name	Results Status
*Patient Middle Initial	Observation Value
*Admission Date/Time	Unit of Measure
*Discharge Date/Time	Reference Range
Order Physician First Name	Abnormal Flag
Order Physician Last Name	Observation Result Status
Order Physician Middle Initial	Comments
Physician Identifier	

* Variables used for linking Lab data to HHIC Inpatient discharge data



DATA QUALITY/STANDARDIZATION

Too much, too little, what is this???

– Too Much

- ALL lab data received vs. 32 requested labs

– Too Little

- Limited or Missing Key Demographic Linking Variables
- Missing Laboratory Data

– What is this?

- Logical Observation Identifiers Names and Codes (LOINC)
- Facility ID Standardization

3. DATA LINKING

Data Variable
Sending Facility
Account Number
Medical Record Number
Date of Birth
Gender
Patient First Name (up to first space if multiple names were present)
Patient Last Name
Date of Admission/Lab Observation Date
SSN

LINKING LAB DATA TO HOSPITAL RECORDS

- Preliminary Linking
 - Based on Account Number and Facility Code
- Deterministic/Probabilistic Linking
 - Multiple linking iterations performed to link the inpatient discharge data to one or more lab records based on 9 key variables
 - Linking Iterations “customized” due to variances on key linking variables for multiple hospitals



OVERALL

Inpatient Discharges Linked to One or more Lab Records

30,668,969

Total Lab tests received
CY2008-2011

9,450,293

Excluded

Not one of the 32;
Outside study period
Missing identifiers; test value,
Not IP lab record
(Duplicate)

21,218,676

Final count linked to Inpatient

86.3%

Hospital Records linked to one or
more lab records



DISCHARGES WITH NO LABS

Reason for Hospitalization	Discharges without Labs	Total Discharges	Percent
Newborns	31,656	66,051	47.9%
Mental Diseases and Disorders	6,808	15,317	44.4%
Diseases and Disorders of the Musculoskeletal System and Connective Tissue	3,982	32,224	12.4%
Pregnancy, Childbirth and the Puerperium	2,303	69,764	3.3%
Diseases and Disorders of the Respiratory System	2,159	37,700	5.7%
Miscellaneous Reasons	14,500	229,700	6.3%
Overall:	61,408	450,756	13.6%



CHALLENGES TO IMPLEMENTATION

- **Competing Initiatives**
 - Hawaii HIE
 - EMR implementations!!
 - Meaningful Use (friend and foe)
 - ACA signed into law March 23, 2010
 - Value Based Purchasing



TODAY IS A BETTER DAY!

- **Technology standard**
 - LOINC
 - HL7 interface
 - EMRs
- **Technology lowers cost**
- **Technology increases feasibility of linking clinical with administrative claims**



Costs

- Software investment
 - HL7 interface
 - \$0 (open source)
 - Commercial solution cost more
- New data feed
 - Error records need resolved
- Hardware – adequate disc space etc.
- Marginal additional cost after setup



MAHALO!

- AHRQ (Grant # 1R01HS019990-01)
- Hospitals
- Clinical Labs Hawaii
- Diagnostic Lab Services
- HHIC Team
 - Christine Reuschel, Project Manager
 - Mike Murata, Data Warehouse Manager
 - Lana Kadooka, Senior Developer
 - Billy Lin, DBA/Business Analyst
 - Jean Kailiawa, Data Manager