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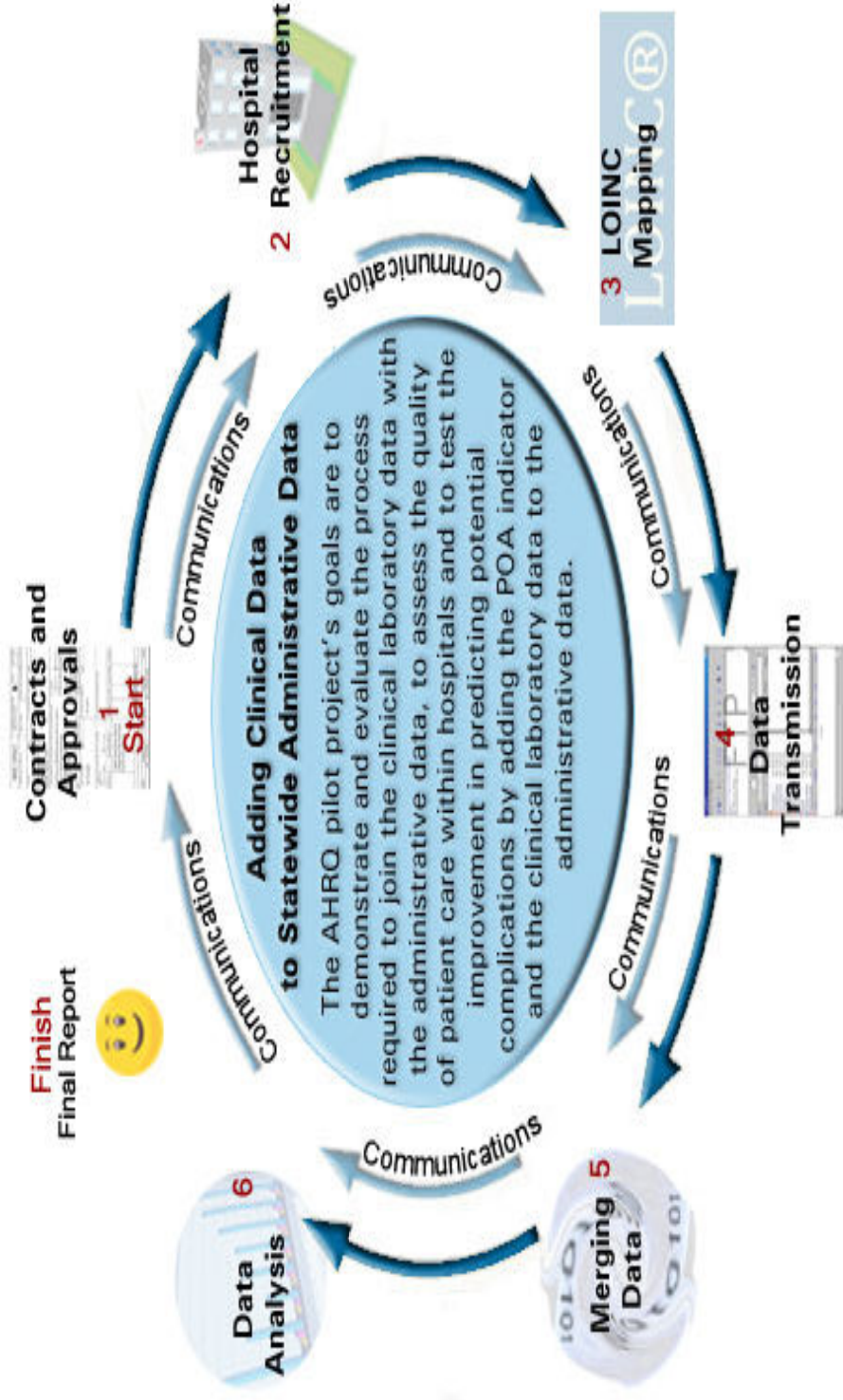
**Adding Clinical Data Elements
to Administrative Data**

**Data Challenges in Joining Clinical
Laboratory Data to Administrative
Inpatient Data**

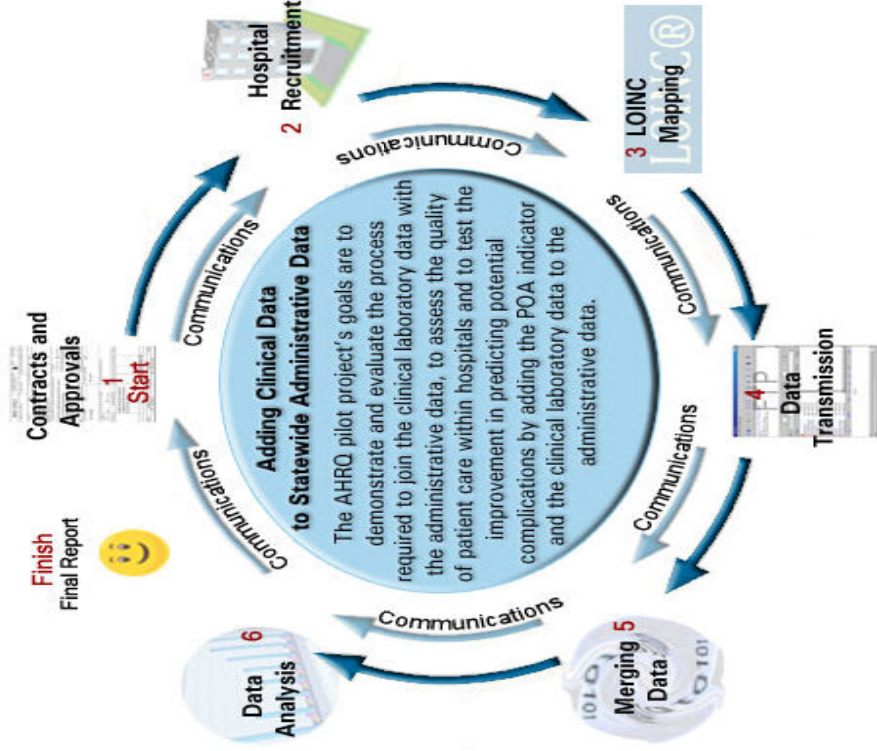
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Florida Agency for Health Care Administration
HCUP Partner's Meeting - November 2009**

Florida Center for Health Information and Policy Analysis

AHRQ Project Stages



What This Talk Will Cover



- o Florida inpatient administrative datasets and Present on Admission coding
- o Laboratory data collected from hospitals in the AHRQ project
- o Need for LOINC coding of lab data
- o Challenges of joining laboratory data to administrative data
- o Challenges of analyzing the data



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Hospitals in the AHRQ Project

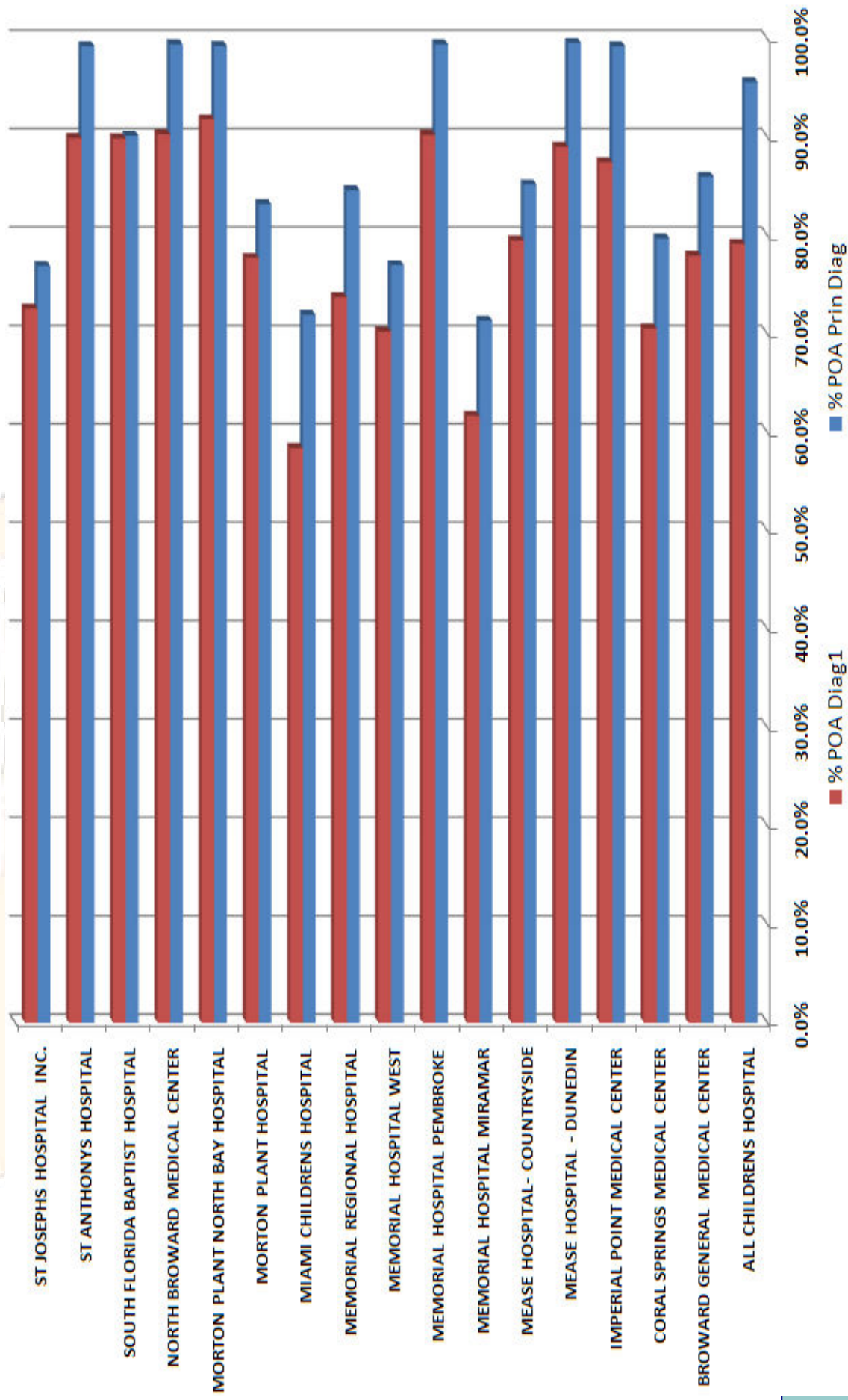
Pediatric Hospitals	Broward Health
All Children's Hospital (216 Beds)	Broward General Medical Center (716 Beds)
Miami Children's Hospital (268 Beds)	Coral Springs Medical Center (200 Beds)
BayCare Health System	Imperial Point Medical Center (204 Beds)
Mease Countryside Hospital (300 Beds)	North Broward Medical Center (409 Beds)
Mease Dunedin Hospital (143 Beds)	Chris Evert Children's Hospital (141 Beds)
Morton Plant Hospital (687 Beds)	Memorial Healthcare System
St. Joseph's Women's Hospital (192 Beds)	Memorial Hospital Miramar (100 Beds)
Morton Plant North Bay Hospital (122 Beds)	Memorial Hospital Pembroke (301 Beds)
St. Joseph's Children's Hospital (164 Beds)	Memorial Hospital West (236 Beds)
South Florida Baptist Hospital (147 Beds)	Memorial Regional Hospital (690 Beds)
St. Anthony's Hospital (365 Beds)	Memorial Regional Hospital South (100 Beds)
St. Joseph's Hospital (527 Beds)	Joe DiMaggio Children's Hospital (100 Beds)

Statutory Authority to Collect Data

- Since 1988 AHCA has exercised its authority to collect Hospital Inpatient Discharge Data
- Data are released for research when 75% of the hospitals have certified the accuracy of data reported - 100% certification generally takes about 180 days
- Rule changes in 2005 allowed AHCA to collect Present on Admission for Principle Diagnosis and 30 other diagnostic codes
- <http://www.floridahealthfinder.gov/Researchers/OrderData/order-data.shtml> to download the coding dictionary

21.	<p>Admitting Diagnosis admitdiag</p>	<p>A valid ICD-9-CM or ICD-10-CM diagnosis code provided by the admitting physician at the time of admission which describes the patient's condition upon admission or purpose of admission. The code must be entered with a decimal point that is included in the valid code and without use of a zero(s) that are not included in the valid code. A required field. <i>(NOTE: Admitting diagnosis data is available beginning first quarter 2006.)</i></p>
22.	<p>Principal Diagnosis Code: prindiag</p>	<p>A valid ICD-9-CM or ICD-10-CM diagnosis code. The principal diagnosis is the code representing the diagnosis established, after study, to be chiefly responsible for occasioning the admission. The code must be entered with a decimal point that is included in the valid code and without use of zero(s) that are not included in the valid code. A required field. <i>(NOTE: Prior to first quarter 2006, principal diagnosis codes did not include decimal points between the third and fourth digit.)</i></p>
23.	<p>Principal Diagnosis Present on Admission Indicator: poa_prin_diag</p>	<p>A character alpha code differentiating whether the condition represented by the corresponding Principal Diagnosis code was present on admission or whether the condition developed after admission as determined by the physician, medical record, or nature of the condition.</p> <p>Y- Yes- Present at time that the order for inpatient admission occurs. N- No- Not present at the time that the order for inpatient admission occurs. U- Unknown- Documentation is insufficient to determine if condition is present on admission. W- Clinically Undetermined- Provider is unable to clinically determine whether condition was present on admission or not. E or Blank Field- Exempt- The condition is exempt from POA reporting. <i>(NOTE: Present on Admission data for the principal diagnosis is available beginning first quarter 2007.)</i></p>

Hospital POA for Principle Diagnoses



Clinical Laboratory Data Elements

Albumin	Glucose	SGOT
Alkaline phosphatase	Hematocrit	SGPT
Base Excess	Mean cell Hemoglobin	Sodium
Bicarbonate	Mean Cell volume	Total bilirubin fractions
Blood urea nitrogen	Partial thromboplastin time	Total Hemoglobin
Blood/Lymph Culture-Positive	pCO2	Troponin I
Calcium (ionized)	pH	White blood cell count
Calcium (total)	Phosphorous	Additional Data Elements
Chloride	Platelets	Date of specimen Run
CPK MB	PO2.sat	Time of Specimen Run
Creatinine	Potassium	Type of test performed
Gamma glutamyl transferase	Prothrombin time	Reference range of test



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Lab Result Interface Code Comparisons

Lab Test Name	All Children's	Miami Children's	BayCare Health	Broward Healthcare	Memorial Healthcare
SGPT	ALT	ALT (SGPT)	ALT	55548699	ALT
Albumin	ALB	Albumin	Albumin	55548695	ALB
Alkaline phosphatase	AP	Alkaline Phos	Alk Phos	55548696	ALKP
SGOT	AST	AST (SGOT)	AST	55548697	AST
Blood/Lymph Culture-Positive	BCECMO	Blood Culture	C Blood	C BLD	CXBLD
Glucose	GLU	Glucose	Glucose	55548690	GLUC
Hematocrit	HCT1	HCT	HCT	55542287	HCT
Total Hemoglobin	HGB1	HGB	HGB	55542285	HGB
Potassium	K1	Potassium	Potassium	55548685	K
Sodium:	NA	Sodium	Sodium	55548683	NA

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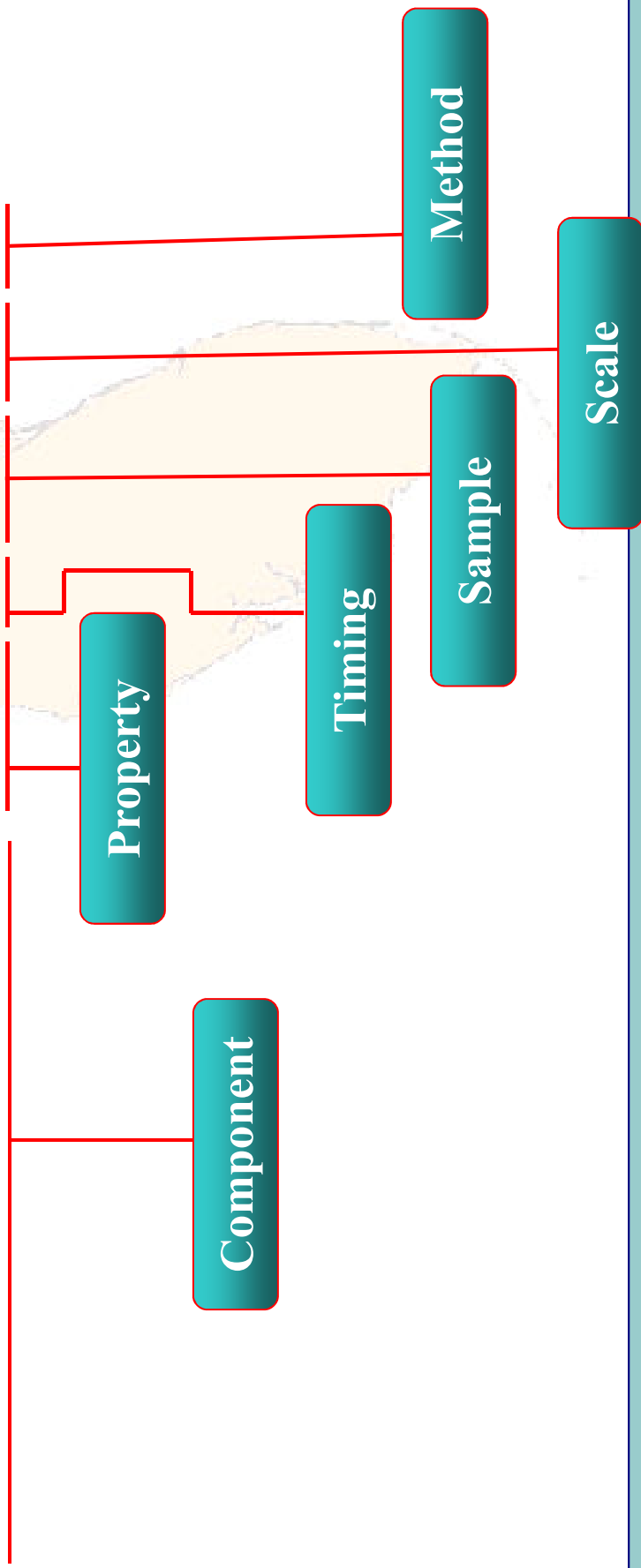
Anatomy of a LOINC Term

Component : Property : Timing : Sample :

5193-8

LOINC Code; sequential number plus check digit

HEPATITIS B SURFACE AB:ACNC:PT:SER:QN:EIA



Lab Result Interface Code Comparisons

Lab Test Name	LOINC Name
SGPT	Alanine aminotransferase:CCnc:Pt:Ser/Plas:Qn:
Albumin	Albumin:MCnc:Pt:Ser/Plas:Qn:
Alkaline phosphatase	Alkaline phosphatase:CCnc:Pt:Ser/Plas:Qn:
SGOT	Aspartate aminotransferase:CCnc:Pt:Ser/Plas:Qn:
Blood/Lymph Culture-Positive	Bacteria identified:Prid:Pt:Bld:Nom:Culture
Glucose	Glucose:MCnc:Pt:Ser/Plas:Qn:
Hematocrit	Hematocrit:VFr:Pt:Bld:Qn:Automated count
Total Hemoglobin	Hemoglobin:MCnc:Pt:Bld:Qn:
Potassium	Potassium:SCnc:Pt:Ser/Plas:Qn:
Sodium:	Sodium:SCnc:Pt:Ser/Plas:Qn:



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Laboratory Dataset Submitted by Hospitals

LOINC Name	LOINC Code	Reference Code	Reference Name	Value	Unit	Value Range	Date	Time
Alanine aminotransferase: CCnc:Pt:Ser/Plas: Qn:	1742-6	41243	ALT	25	units/L	7-56	2007-04-14	07:05
Aspartate aminotransferase: CCnc:Pt:Ser/Plas: Qn:	1920-8	41242	AST	41	units/L	5-40	2007-04-14	07:05
Albumin:MCnc:Pt: Ser/Plas:Qn:	1751-7	41239	Albumin Lvl	3.6	gm/dL	3.9-5.0	2007-04-14	07:05
Alkaline phosphatase:CCn c:Pt:Ser/Plas:Qn:	6768-6	41241	Alk Phos	220	units/L	38-126	2007-04-14	07:05
Urea nitrogen:MCnc:Pt: Ser/Plas:Qn:	3094-0	41220	BUN	7	mg/dL	7-18	2007-04-14	07:05

Blood Culture Laboratory Data

LOINC Name	LOINC Code	Test ID	Isolate Number	Organism Name	Date	Time	Freetext
Blood/Lymph Culture-Positive	600-7	CXBLD	2	Klebsiella pneumoniae	4/4/2007	11:15	!PIMIC RVTK1;04/08/07;08:56;
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Strep. pneumoniae	4/4/2007	12:10	!DIFF1-:53; ^48- @Preliminary ID: Alpha hemolytic Streptococcus. ;
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Corynebacterium, not jeikeium	4/4/2007	16:40	No further work-up.
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Staphylococcus aureus	4/4/2007	17:50	!SDRT EAD;04/06/07;09:38;Dox=R ~&MRSA;
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Klebsiella oxytoca	4/4/2007	11:19	@Preliminary ID: Gram negative bacilli
Blood/Lymph Culture-Positive	600-7	CXBLD	2	Klebsiella pneumoniae	4/4/2007	11:19	!PIMIC RVTK1;04/08/07;08:56;!PI MIC1 RVTK1;04/08/07;08:56;
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Klebsiella oxytoca	4/4/2007	11:15	@Preliminary ID: Gram negative bacilli
Blood/Lymph Culture-Positive	600-7	CXBLD	1	Staphylococcus aureus	4/4/2007	17:50	NOTICE! This is a Methicillin Resistant Staph Aureus (MRSA).

Lab Matches from 3M HIS

Adm	Counts	not in Lab	not in blood
BayCare\Final 2\deit Mease Dunedin admin del 2006	4,793	191	4,793
BayCare\Final 2\deit Morton Plant North Bay admin del 2006	4,838	1,359	4,838
BayCare\Final 2\deit Morton Plant admin data del 2006	23,662	23,662	23,662
BayCare\Final 2\deit St Anthony admin del 2006	8,158	392	8,158
BayCare\Final 2\deit St Joseph admin del 2006	37,214	4,914	37,214
BayCare\Final 2\deit mease countryside admin del 2006	12,929	1,286	12,929
BrowardHealth\Final\deit Broward General Medical Center Admi	21,896	1,863	21,896
BrowardHealth\Final\deit Coral Springs Medical Center Admin	9,876	1,314	9,876
BrowardHealth\Final\deit Imperial point admin 2006	5,318	272	5,318
BrowardHealth\July 09 final\deit revised admin broward North	10,120	182	10,120
Memoria\Final\deit Memorial Pembroke admin del 2006 Tab	5,185	1,344	5,109
Memoria\Final\deit Memorial West admin del 2006 Tab	20,405	7,680	20,206
Memoria\Final\deit Miramar admin del 2006 Tab	8,142	3,530	8,094
Memoria\Final\deit Regional del 2006 Tab	28,401	12,605	28,139
MiamiChildren\July 09 Final\deit Miami admin 2008	12,060	10,815	9,047
allchildrens\Final\july09\deit revised admin all children de	5,947	1,086	5,702
TOTAL	218,944		

Pediatric Blood Cultures in First 24 Hours

Principle Diagnosis = 771.81 – Septicemia of Newborn

Tests	Not Present on Principal Diagnosis	Tests	Present on Principal Diagnosis
1	Calcium.ionized:SCnc:Pt:Bld:Qn:	2	Bilirubin:MCnc:Pt:Ser/Plas:Qn:
1	Calcium:MCnc:Pt:Ser/Plas:Qn:	2	Calcium:MCnc:Pt:Ser/Plas:Qn:
1	Chloride:SCnc:Pt:Ser/Plas:Qn:	2	Chloride:SCnc:Pt:Ser/Plas:Qn:
1	Creatinine:MCnc:Pt:Ser/Plas:Qn:	2	Creatinine:MCnc:Pt:Ser/Plas:Qn:
1	Erythrocyte mean corpuscular hemoglobin:EntMass:Pt:RBC:Qn:Automated count	2	Erythrocyte mean corpuscular hemoglobin:EntMass:Pt:RBC:Qn:Automated count
1	Glucose:MCnc:Pt:Ser/Plas:Qn:	2	Glucose:MCnc:Pt:Ser/Plas:Qn:
1	Hematocrit:VFr:Pt:Bld:Qn:Automated count	2	Hematocrit:VFr:Pt:Bld:Qn:Automated count
1	Leukocytes:NCnc:Pt:Bld:Qn:Automated count	2	Leukocytes:NCnc:Pt:Bld:Qn:Automated count
1	Mean corpuscular volume:EntVol:Pt:RBC:Qn:Automated count	2	Mean corpuscular volume:EntVol:Pt:RBC:Qn:Automated count
1	Platelets:NCnc:Pt:Bld:Qn:Automated count	2	Platelets:NCnc:Pt:Bld:Qn:Automated count
1	Potassium:SCnc:Pt:Ser/Plas:Qn:	2	Potassium:SCnc:Pt:Ser/Plas:Qn:
1	Sodium:SCnc:Pt:Ser/Plas:Qn:	2	Sodium:SCnc:Pt:Ser/Plas:Qn:
1	Urea nitrogen:MCnc:Pt:Ser/Plas:Qn:	2	Urea nitrogen:MCnc:Pt:Ser/Plas:Qn:

Patient to Lab Ratios

Hospital	Patient Admissions	Labs	Labs per Patient	Length of Stay - Days
BayCare Health System	91,594	3,636,370	39.7	4.2
Broward Health	47,210	4,677,511	99.1	4.1
Memorial Healthcare	62,130	3,631,655	58.5	3.5
Miami Children's	12,060	10,397	0.9	5.1
All Children's	5,947	316,479	53.2	6.3

Lessons Learned and Lessons to Learn

- Never underestimate the complexity of your data
- Never overestimate the power of your analysis tools
 - Computer speed and memory must be sufficient
 - Software capacity for creating and managing a large database is vital
- Don't assume you can "knock off" a data analysis in an afternoon
- Always appreciate the database work that has gone on before you and remember to ask for help

Conclusions

- The AHRQ “Adding Clinical Data to Administrative Data” opened up new avenues to data collection and data analysis in Florida that will carry over into other areas, such as health information exchange
- Conducting the LOINC mapping and translation and collecting the laboratory data was the easy part – joining the clinical and laboratory datasets has proven to be the true challenge in working with the data
- The potential for new analytic approaches in working with administrative and laboratory data creates many opportunities for future research and discovery



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