

# Evaluation of National Healthcare Safety Network (NHSN) Data Available through the Arizona Department of Health Services Data Use Agreement (DUA)

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# Outline

- Introduction/Background
- Methods
- Results
- Conclusions
- Next Steps



# Learning Objectives

- Describe the National Healthcare Safety Network (NHSN) and its components
- Identify the completeness and representativeness of NHSN data available to ADHS
- Describe differences in MRSA surveillance data between MEDSIS and NHSN
- Understand how the sensitivity of NHSN for capturing MRSA events reported to MEDSIS was calculated
- Describe positive outcomes as a result of this surveillance system evaluation

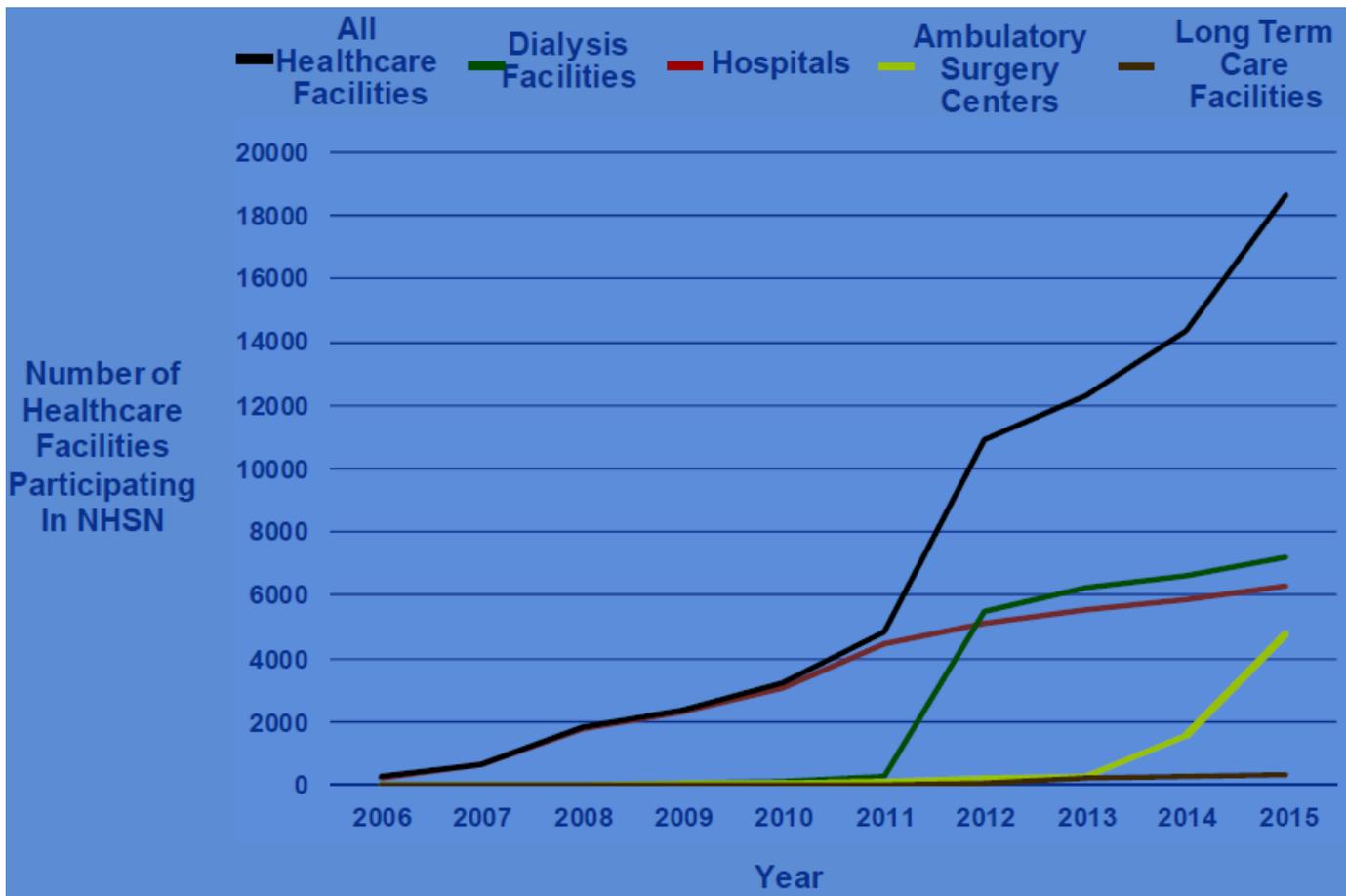


# Background

- The National Healthcare Safety Network (NHSN) is the most widely used healthcare-associated infection (HAI) tracking system in the U.S.
  - Used by over 17,000 healthcare facilities
  - Standardized definitions, protocols
- Acute care hospitals and dialysis facilities represent the majority of reporting facilities
  - Other participants include:
    - Critical access hospitals
    - Long-term acute care hospitals
    - Rehabilitation hospitals
    - Psychiatric hospitals
    - Ambulatory surgery centers
    - Nursing homes



# NHSN: Growth in Facility Participation, 2006-2015



Pollock, Daniel A. National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance (AUR) Reporting and the Standardized Antimicrobial Administration Ratio (SAAR) [http://www.houstontx.gov/health/Epidemiology/7\\_Pollock-NHSN\\_AUR\\_and\\_SAAR.pdf](http://www.houstontx.gov/health/Epidemiology/7_Pollock-NHSN_AUR_and_SAAR.pdf)



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# Background

- In Arizona, reporting HAIs through NHSN is not mandatory
  - 33 states and the District of Columbia have mandatory reporting requirements
  - Most acute care hospitals report data to NHSN as a requirement for reimbursement by the Centers for Medicare and Medicaid Services (CMS)
- Through a data use agreement (DUA) with CDC, the HAI program gained direct access to NHSN data in the fall of 2015
  - 6 other states currently have a DUA with CDC



# CDC Reports Hospital-Specific HAI Event Data to the Centers for Medicare and Medicaid Services (CMS)

HAI Event	Hospital Type	Start Date
CLABSI	Acute Care Hospitals - ICUs	2011
	Long Term Care Hospitals	2012
	Cancer Hospitals	2013
	Acute Care Hospitals – Ward locations	2015
CAUTI	Acute Care Hospitals - ICUs	2012
	Long Term Care Hospitals	2012
	Inpatient Rehabilitation Facilities	2012
	Cancer Hospitals	2013
	Acute Care Hospitals – Ward locations	2015
SSI – colon surgery and abdominal hysterectomy	Acute Care Hospitals - ICUs	2012
	Cancer Hospitals	2014
MRSA Bacteremia LabID Event	Acute Care Hospitals	2013
	Long Term Care Hospitals	2015
	Inpatient Rehabilitation Facilities	2015
	Cancer Hospitals	2016
<i>C. Difficile</i> LabID Event	Acute Care Hospitals	2013
	Long Term Care Hospitals	2015
	Inpatient Rehabilitation Facilities	2015
	Cancer Hospitals	2016
Ventilator Associated Event	Long Term Care Hospitals	2016

Pollock, Daniel A. National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance (AUR) Reporting and the Standardized Antimicrobial Administration Ratio (SAAR) [http://www.houstontx.gov/health/Epidemiology/7\\_Pollock-NHSN\\_AUR\\_and\\_SAAR.pdf](http://www.houstontx.gov/health/Epidemiology/7_Pollock-NHSN_AUR_and_SAAR.pdf)



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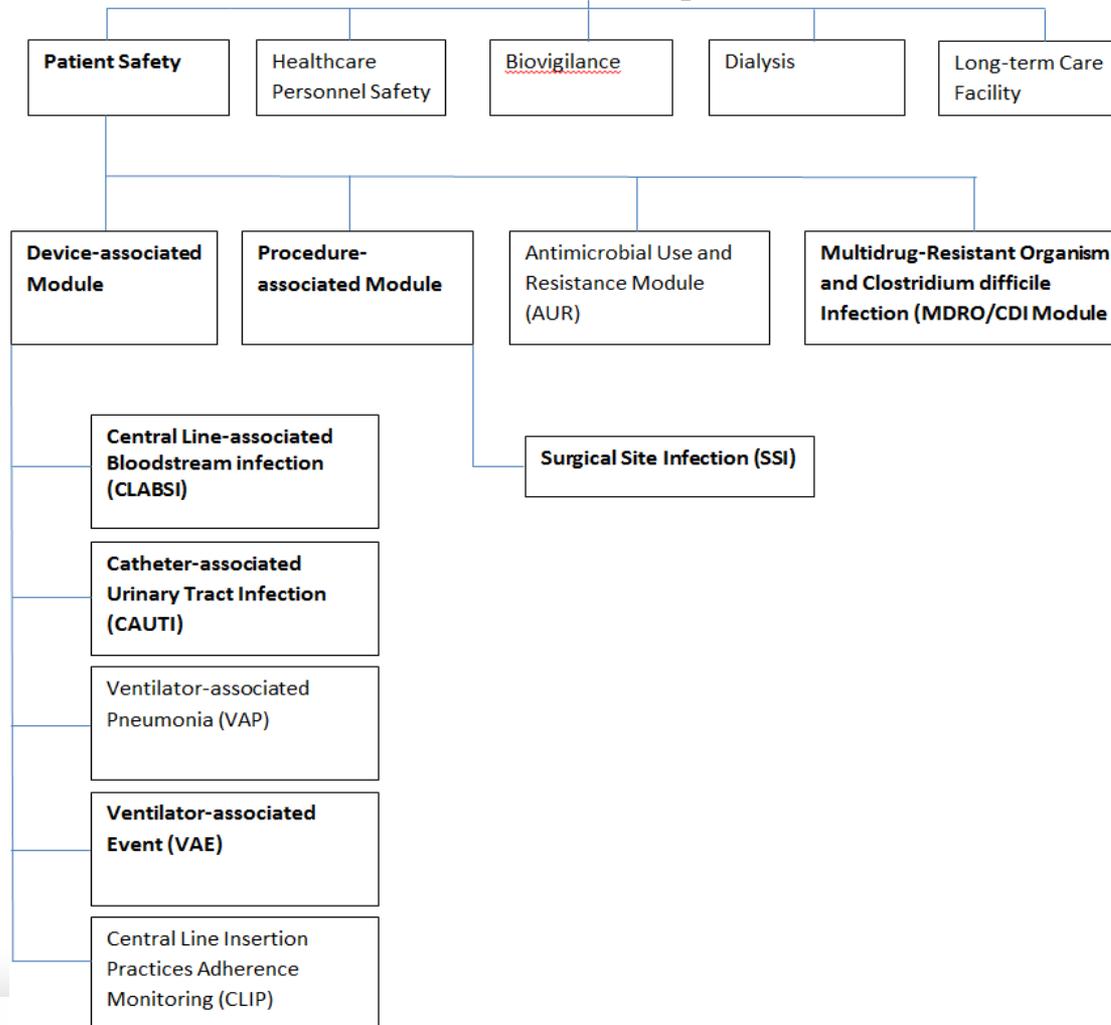
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# Background

- Main infection types tracked include:
  - Central Line-Associated Bloodstream Infection (CLABSI)
  - Catheter-Associated Urinary Tract Infection (CAUTI)
  - Surgical Site Infections (SSIs)
  - Lab-identified methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia
  - Lab-identified *Clostridium difficile* (*C. difficile*) infections



# NHSN Components



# Surveillance Objectives

- Estimate the burden of selected HAIs in the state of Arizona
- Monitor changes in the number of HAIs over time
- Target prevention efforts
- Evaluate the impact of prevention strategies
- Detect HAI-related outbreaks



# National Healthcare Safety Network (NHSN) Evaluation

- Using the CDC's *Updated Guidelines for Evaluating Public Health Surveillance Systems* evaluated on:
  - **Data Quality (Completeness)**
  - **Representativeness**
  - **Sensitivity**
  - **Stability**
  - **Simplicity**
  - **Timeliness**
  - **Predicted Value Positive**
  - **Acceptability**
  - **Flexibility**



# Methods

- **Representativeness** was assessed by identifying all Arizona acute care hospitals (ACH) and critical access hospitals (CAH) and comparing data available through NHSN; facilities without available data were identified and characterized
- **Completeness** was assessed by comparing hospitals with NHSN data available to ADHS, by infection type, to those available to CDC
- **Sensitivity** of NHSN for capturing invasive MRSA events reported to Arizona's communicable disease surveillance system (MEDSIS) was completed by matching all 2014 NHSN LabID MRSA data to 2014 MEDSIS MRSA cases
- Additional surveillance system attributes were also considered in the evaluation



# Representativeness

- We identified 74 acute care hospitals (ACH) in the state of Arizona through the American Hospital Directory by using the last four digits of each facility's CMS Certification Number (CCN)
  - 53 of the 54 hospitals in our Super Group are classified as acute care hospitals
- The Center for Rural Health at the University of Arizona recognizes 14 critical access hospitals (CAH) in the state
  - 1 of the 54 hospitals in our Super Group, one is designated a critical access hospital



# Hospitals Represented

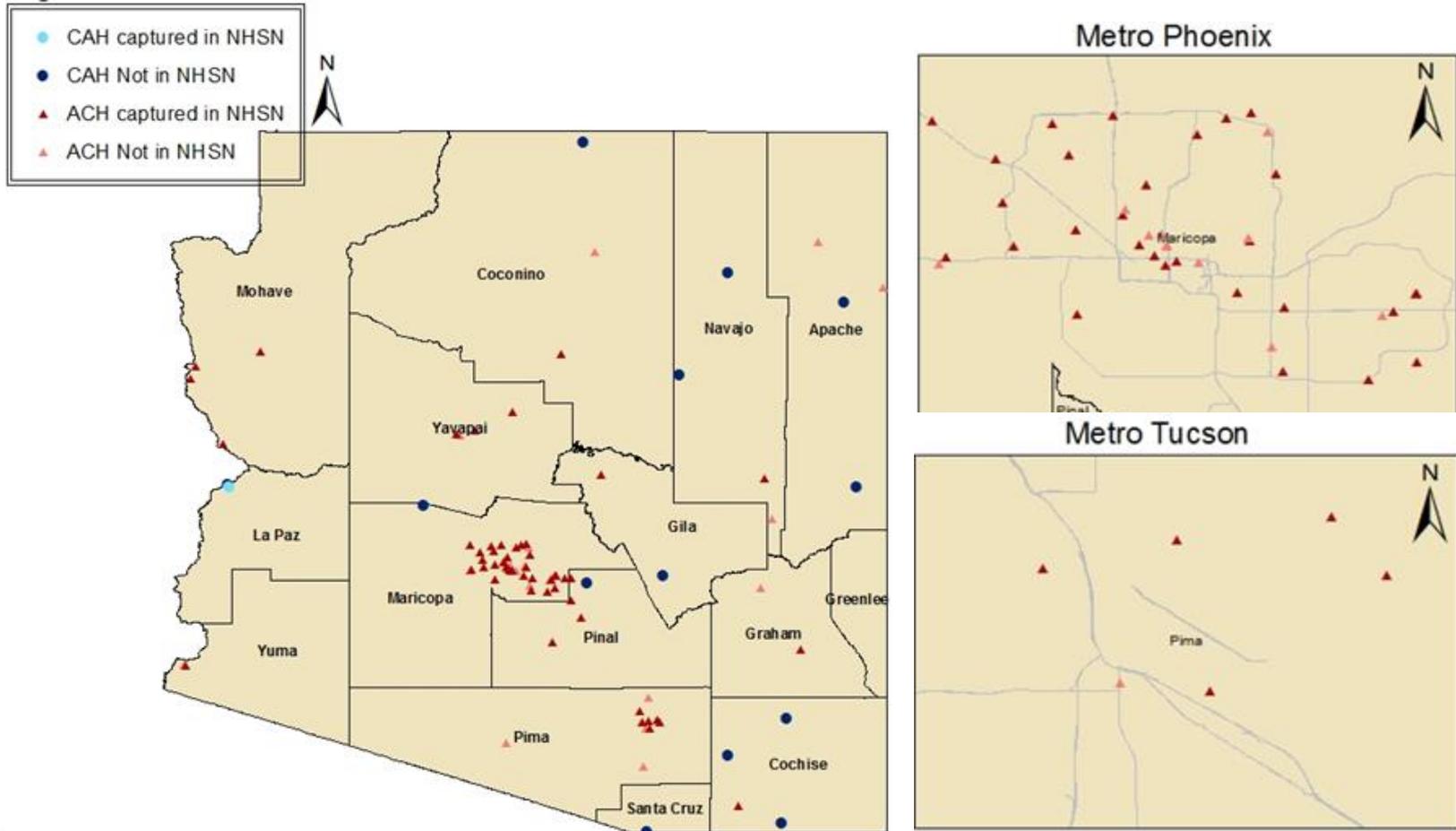
Hospital Type	# Hospitals in Arizona	# IHS/638 Hospitals in Arizona	#VA Hospitals in Arizona	# Hospitals in Super Group	% Represented
Acute Care Hospital	74	8	3	53	72%
Critical Access Hospital	14	4	0	1	7%

Veteran Affairs (VA) and Indian Health Services (IHS)/638 facilities were identified as group not available to ADHS

All 54 of our Hospitals were classified as “General Hospital” in NHSN



# Hospitals in Arizona



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# Hospital Reporting Plans, January 2015

Reporting Plan	Total # of Hospitals in ADHS Super Group	# of Hospitals Reporting, per facility's reporting plan	% Reporting
CLABSI	54	54	100%
CAUTI	54	54	100%
VAE	54	26	48%
SSI COLO	54	53	98%
SSI HYST	54	53	98%
MRSA LabID (Blood)	54	40	74%
MRSA LabID	54	15**	28%
MRSA (Any)	54	54**	100%
CDI LabID	54	54	100%

\*Not all hospitals are required to report all infections; for example some hospitals do not have ventilated patients or do not perform surgeries

\*\*One Hospital reported MRSA as both LabID Blood and LabID

# Hospitals Reporting to NHSN

Module	# Hospitals Reporting to NHSN, per CDC report	# Hospitals with data available to ADHS Super Group	% Reporting Hospitals in ADHS Super Group
CLABSI (Central Line-Associated Bloodstream Infection)	60	54	90%
CAUTI (Catheter-Associated Urinary Tract Infection)	60	54	90%
SSI (Surgical Site Infection) HYST	53	53	100%
SSI (Surgical Site Infection COLO	56	53	95%
MRSA LabID	68	54	79%
CDI LabID	68	54	79%



# Completeness

- 54 hospitals in our DUA Super Group
- ADHS has access to the data for 90% of the acute care hospitals in the state reporting CLABSI and CAUTI
- ADHS only has data available for 79% of the reporting hospitals in state for MRSA and CDI LabID reporting.



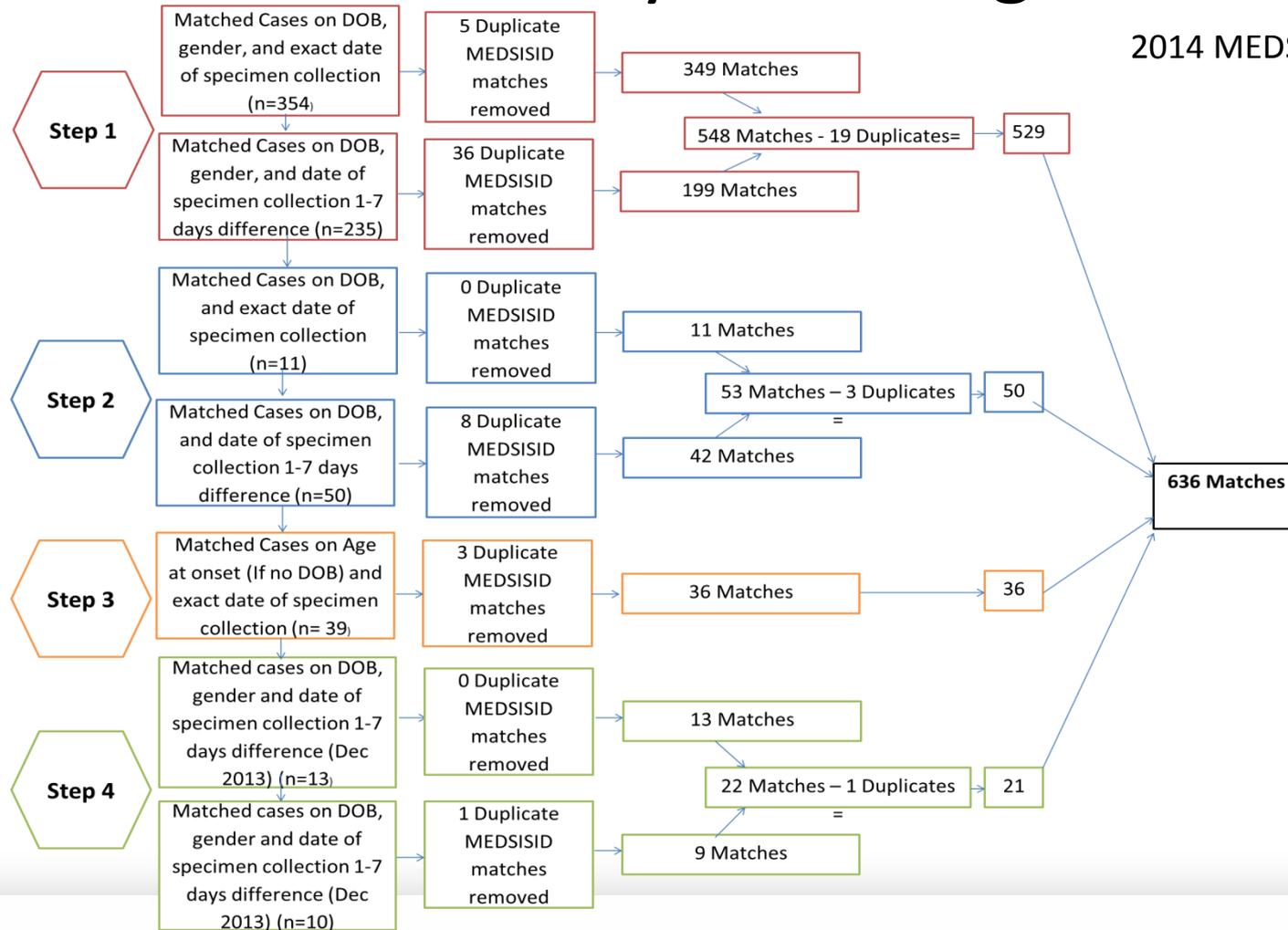
# Sensitivity

- Due to a lack of patient identifiers, a fairly strict matching protocol was used
- Variables used to match include date of birth (DOB), gender, and date of specimen collection
  - Only cases that matched within seven days of specimen collection between the two surveillance systems were included
  - Age was used for MEDSIS cases missing DOB



# MRSA Sensitivity Matching Process

2014 MEDSIS Cases = **1178**



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# MRSA Matching and Sensitivity

Matching Protocol	# of MEDSIS cases matched to NHSN records	% Matched (Sensitivity)
Matched exact date of specimen collection	409	35%
Matched date of specimen collection 1-7 days	227	19%
<b>2014 MRSA MEDSIS Cases (n=1178)</b>	<b>636</b>	<b>54%</b>

- Nearly two-thirds matched the exact date of specimen collection
- 54% Sensitivity of NHSN for capturing invasive MRSA events reported to MEDSIS represents a conservative estimate of sensitivity



# Limitations to comparing MEDSIS and LabID data

MEDSIS	NHSN
MEDSIS case combines all reports for a single patient	Each unique report is a separate event recorded in NHSN
Only sterile body sites included	“Blood Only” or “All Specimen” depending on reporting plan
Patient names available	Patient names not available
DOB not a required field	DOB a required field
No onset classification	Community-Onset (CO) or Hospital-Onset (HO) based on admission and test date
Date of specimen collection not required	Date of specimen collection required and used in CO or HO classification
Population-level surveillance system	Hospital-based surveillance system



# Conclusions

## ***As a result of identifying gaps in facility data completeness:***

- ADHS was granted access to 18 additional facilities in December 2015
  - 10 long-term acute care hospitals (LTACHs) and 8 inpatient rehabilitation facilities (IRFs)
- ADHS was granted access to 11 additional facilities in February 2016 representing six additional facility types:
  - Children's Hospital
  - Oncology Hospital
  - Critical Access Hospital
  - Orthopedic Hospital
  - Psychiatric Hospital
  - Surgical Hospital
- ADHS was granted access to 115 dialysis facilities in April 2016



# Conclusions

NHSN Facility Type	# Facilities (August 2015)	# Facilities (February 2016)
HOSP-GEN	54	54
HOSP-LTAC	0	10
HOSP-REHAB	0	8
HOSP-CAH	0	2
HOSP-CHLD	0	1
HOSP-SURG	0	3
HOSP-ORTHO	0	2
HOSP-ONC	0	1
HOSP-PSYCH	0	2
<b>Total</b>	<b>54</b>	<b>83</b>

**\* 54% increase in Facilities**



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# Potential Reasons for Low Sensitivity

- Hospital not reporting to NHSN or not in our supergroup
- Invasive MRSA cases that were not hospitalized
- MEDSIS cases that did not meet the criteria for reporting to NHSN
  - MRSA in non-blood normally sterile sites in facilities only reporting blood isolates to NHSN
- Persons present in both sets of data but whose records did not match based on our matching criteria
- Under-reporting to NHSN of MRSA events by the reporting facilities

**47/54 (87%) hospitals reported at least 1 MRSA LabID event in 2014**

- 42/47 (89%) matched at least 1 event with MEDSIS

**Data validation with Arizona hospitals will help distinguish some of these factors**



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# Next Steps

This surveillance evaluation has provided the HAI Program with the groundwork necessary to conduct more specific analyses, and be better equipped to accurately interpret the findings from Arizona's NHSN data

## **Future Activities:**

- Use NHSN data to create annual reports for HAIs
- Use data to drive collaborative interventions to reduce HAIs in the state
- Begin conducting data validation



# Acknowledgement

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# THANK YOU

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