

*HEALTHCARE-ASSOCIATED INFECTIONS (HAI)
DATA QUALITY REVIEW FINDINGS
SFY 2015 (2014 DATA)*

*MARYLAND HEALTH CARE COMMISSION
(MHCC 11-016)*

Presentation Outline

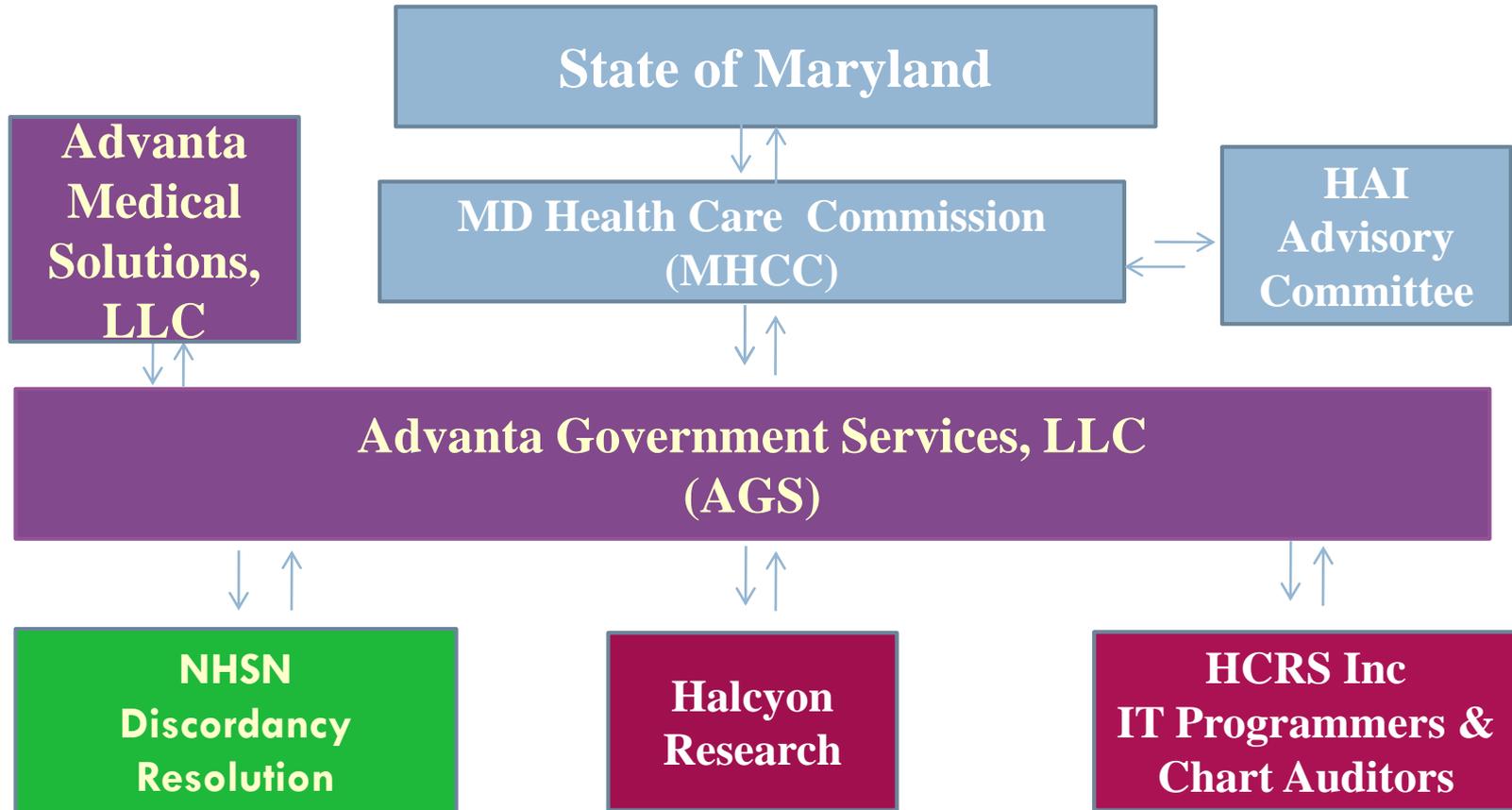
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- Introduction/Purpose
- The Data Quality Review Project
- Statewide Findings
- General Recommendations
 - Q&A
- Individual Event Types
 - Process
 - Findings
 - Recommendations,
 - Q & A
- Conclusion



Introduction – Project Structure

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Project Objectives

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- Review the completeness & accuracy of HAI data collected thru CDC's NHSN surveillance system.
- Use alternative data sources including HSCRC case mix (clinical) data to target audit activities
- Develop cost effective alternative to random on-site chart reviews
- Identify data quality issues in the HSCRC data
- Provide recommendations & training to facilitate data quality improvement.

Project Overview

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- Contract with Advanta Government Services, LLC
 - ▣ Five years
 - ▣ Modifications made to original yearly plans
 - SFY 2012- CLABSI on-site chart review audits
 - SFY 2013- CLABSI on-site chart review audits
 - SFY 2014- SSI on-site chart review audits
 - SFY 2015- HAI Data Quality Review- all event types
 - SFY 2016- Education, focused on-site reviews, foster collaborative process improvement

HAI Data Quality Review

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- Data reported to NHSN
 - Accurate
 - Complete
 - Consistent
 - Timely
 - Reproducible



HAI Reporting

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- IP- Report all cases that meet NHSN surveillance definitions
- Leadership & Physicians- Respect and support the NHSN reporting process



SURVEILLANCE

Population based
Standard definitions
Data collection & analysis
Process improvement
NHSN Event

CLINICAL

Patient based
All available data
Unique diagnosis
Guide medical treatment
HSCRC ICD-9-CM /CPT coding

CDC/NHSN-CMS Communique

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- Response to reports of reporting avoidance activity
 - Purposeful non-reporting, deviations from standards of medical care, & pressure on IPs to alter data submitted to NHSN
- CDC/NHSN- CMS Communique October 7, 2015
 - Addressing Failure to Report HAIs
 - Input from
 - AHA, FAH, APIC



Communique (cont.)

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- NHSN
 - ▣ Right to revoke enrollment if knowingly violate NHSN protocols
- The United States Department of Health and Human Services Office of the Inspector General
 - ▣ Unable to reconcile differences within facility
 - ▣ Intentional deviations from NHSN reporting protocols
 - ▣ Hotline 1-800-447-8477
 - ▣ <https://oig.hhs.gov>



Data Review Focus

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- 2014 NHSN data
 - Surgical Site Infection (SSI)
 - Catheter-Associated Urinary Tract Infection (CAUTI)
 - Central Line-Associated Blood Stream Infection (CLABSI)
 - CDIF toxin-positive stool specimens
 - MRSA bacteremia/MRSA positive blood cultures

Statewide Findings

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- SSI procedures
 - ▣ 8,469 reported to NHSN
 - ▣ 343 (4.1%) potential over-reported
 - ▣ 1,097 (13%) potential under-reported
- SSI Events
 - ▣ 170 reported to NHSN
 - ▣ 5 (2.9%) potential over-reported
 - ▣ 246 (144.7%) potential under-reported

Statewide Findings

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- 3,334 CDIF specimens reported to NHSN
 - ▣ 1,867 potential errors
- 583 MRSA specimens reported to NHSN
 - ▣ 692 potential errors
- 151 CAUTI reported to NHSN
 - ▣ 5 (3.4%) device Insertion coded
 - ▣ 5 (3.4%) infection related to urinary catheter coded
- 49 CLABSI reported to NHSN
 - ▣ 38 (77.6%) device insertion coded
 - ▣ 11 (22.5%) bacteremia related to a central line coded

Lessons Learned

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- Findings from review to be used by
 - State
 - MHCC
 - Reference for education tools & future audits
 - HSCRC
 - Develop additional screening tools
 - Facility
 - Identify system vulnerabilities
 - Initiate process improvements

HAI Data Quality

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- How do we achieve HAI data quality?
 - ▣ Leadership
 - ▣ Interdepartmental ownership & accountability
- Majority of key elements in HAI reporting
 - ▣ Medical record documentation
 - 67-95%- Medical record
 - Accurate, complete, archived, & retrievable
 - 5-33% - IP



HAI Data Quality (cont.)

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- All departments have numerous responsibilities
 - ▣ Do all departments have HAI slices in their pies?

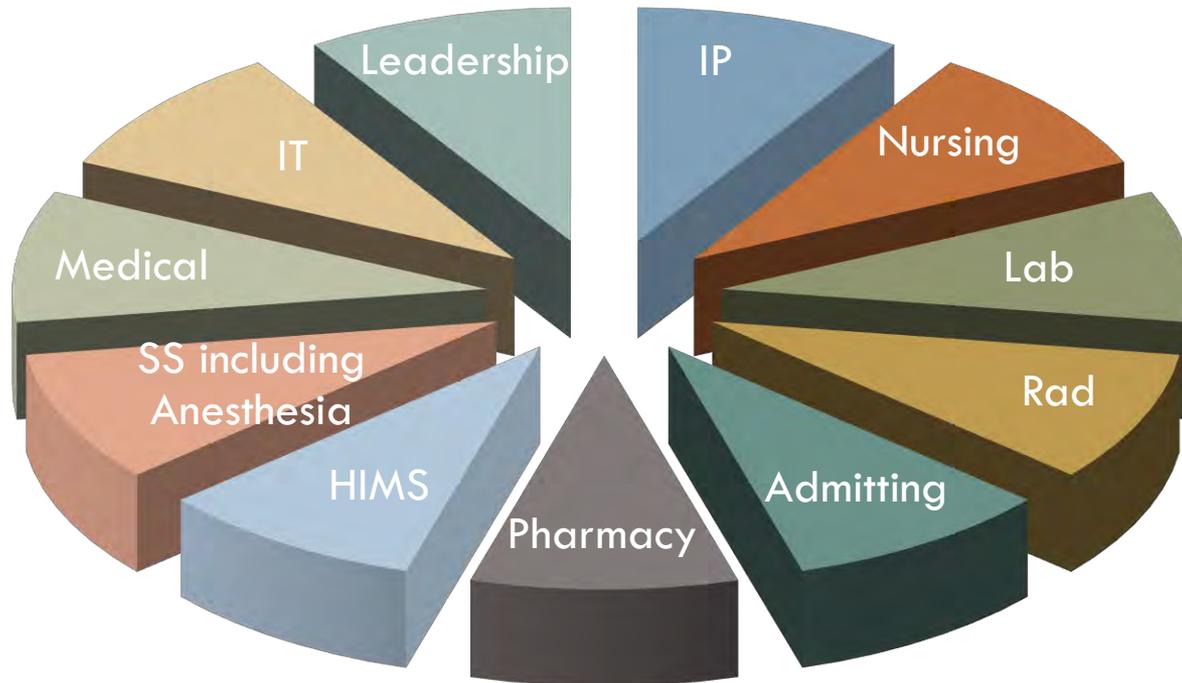


HAI Data Quality (cont.)

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- Multidisciplinary approach not just for HAI prevention

HAI Data Quality



MHCC Recommendations

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- Multidisciplinary & interdepartmental review of HAI surveillance processes
 - Identify key reporting elements
 - Assign departmental responsibility
 - Assure accurate documentation
 - Retrieval of key elements
- NHSN on-line HAI educational resources
 - IP & multidisciplinary team
 - Initial & Ongoing education



Questions

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- Questions from CEO's/CFO's
- Details for each event type will follow



HAI Data Reliability

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- Denominator data
 - ▣ Identify at risk populations
 - ▣ Device, Patient days & Admission totals
 - ▣ Specific NHSN requirements by event type
 - ▣ Compliance difficult when data available does not meet NHSN requirements



HAI Data Reliability (cont.)

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- Numerator Data
 - ▣ HAI Events determined by IP
 - ▣ Factors
 - NHSN definitions & reporting guidelines
 - Medical record documentation



HAI Data Reliability (cont.)

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□ Denominator & Numerator accuracy

▣ Collection & Reporting

- Specific requirements for each event type
- Labor intensive
- Electronic collection processes
 - Adhere to NHSN guidelines
 - NHSN specified validation parameters
 - Compare to manual counts at least 3 months
 - +/- 5%



SSI Reporting Overview

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- SSI reporting components
 - ▣ Surgical Procedures – NHSN denominator
 - CBGB, CBGC
 - COLO
 - HPRO
 - HYST
 - KPRO
 - ▣ SSI Events – NHSN numerator
 - Infections related to surgical site following NHSN defined operative procedure

NHSN SSI Overview

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□ 1st Q 2014 NHSN SSI data

NHSN Reporting by Procedure Type 1Q 2014							
NHSN Reported	Total	CBGB	CBGC	COLO	HPRO	HYST	KPRO
Procedures	8,469	566 (6.7%)	41 (0.5%)	1,344 (15.9%)	1,966 (23.2%)	1,252 (14.9%)	3,300 (39%)
SSI: All Types	170	10 (5.9%)	0 (0%)	106 (62.4%)	19 (11.2%)	19 (11.2%)	16 (9.4%)
SSI: DIP/OS	94	6 (6.4%)	0 (0%)	51 (54.3%)	11 (11.7%)	13 (13.8%)	13 (13.8%)

Data Review Findings

SSI Procedures

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□ Procedure findings 1st Q 2014

Qualifying Procedures 1Q 2014			
NHSN SSI Reporting	Reported to NHSN	Potential Over-Reported Procedure	Potential Under-Reported Procedures
Qualifying Surgical Procedures	8,469	343 (4.1%)	1,097 (13.0%)

Data Review Findings

SSI Events

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□ SSI events

- Facility report workbook with line list of discrepant cases

SSI Events 1Q 2014					
NHSN SSI Reporting	SSI Reported to NHSN	SSI DIP/OS	SSI Other	Potential Over-Reported DIP/OS SSI	Potential Under-Reported SSI
SSI Events	170	94 (55.3%)	76 (44.7%)	5	141 (82.9%) (1) 105 (61.8%) (2) <u>Total 246</u>
(1) Identified by infection codes during a readmission following a stay for a qualifying procedure.					
(2) Identified by infection codes during the same stay as the qualifying procedure, excluding colon surgeries.					

Data Review Findings

SSI Events (cont.)

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- Potentially under-reported SSI
 - ▣ Readmission (RE): infection codes in HSCRC data within specified infection surveillance window
 - 30 or 90 days
 - ▣ Same-stay (SS) infection codes in HSCRC data
 - Same admission as index procedure



SSI Event to HSCRC Verification

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□ NHSN Reported SSI: DIP/OS

NHSN DIP/OS Detection 1Q 2014						
NHSN Reported SSI	Detection During Index Adm.	Detection Readmit Same Facility	Detection Readmit Other Facility	Detection Post-discharge	Eligible for NHSN Event to HSCRC Stay Match	Ineligible for NHSN Event to HSCRC Stay Match
94	40 (42.5%)	42 (44.7%)	4 (4.3%)	8 (8.5%)	82	12

NHSN/HSCRC Findings 1Q 2014				
NHSN Reported SSI	Eligible NHSN Event to HSCRC Stay Match		NHSN Event to HSCRC Stay Match	NHSN Event to HSCRC Stay No Match
94	82		79 (96%)	3 (4%)

Role of HSCRC Administrative Data SSI Reporting

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□ Highly effective

▣ Potential over & under-reported

- Procedures (denominator)
- SSI (numerator) except COLO during same-stay
 - Infection codes for COLO
 - Large subset-lack of specificity
 - COLO procedures have higher potential for initial admission diagnoses codes = infection codes
 - Intestinal perforation/peritonitis
 - Abscess
 - Fistula

SSI Questions

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□ Questions?



LabID Event Reporting

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- **IS NOT** MDRO/CDI infection surveillance
- Calculate proxy measures
 - Healthcare acquisition
 - Exposure burden
 - Infection burden
- Decrease the surveillance burden
- Complex guidelines
 - On-line tools



NHSN LabID Events Overview

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- LabID NHSN logistics “Onset” assignment

LabID Event MRSA (blood specimen only) NHSN Onset Assignment 1&2Q 2014			
	NHSN Events	Hospital Onset (HO)	Community Onset (CO)
MRSA	583	156 (26.8%)	427 (73.2%)

NHSN LabID Events Overview(cont.)

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□ LabID NHSN logistic CDIF categorization

LabID Event CDIF Categorization NHSN 1&2Q 2014				
	NHSN Events	Incident	Recurrent	Neither
CDIF	3,334	3112 (93.34%)	201 (6.03%)	21 (0.63%)

LabID Event CDIF NHSN Onset Assignment 1&2Q 2014				
	NHSN Events	Hospital Onset (HO)	Community Onset (CO)	Community-Onset Healthcare Facility-Associated (CO-HCFA)
Incident	3,112	1286 (41.3%)	1423 (45.7%)	403 (13.0%)
Recurrent	201	56 (27.86%)	51 (25.37%)	94 (46.766%)
Neither	21	14 (66.67%)	0 (0%)	7 (33.33%)

LabID Data Submission Challenges

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- Facility
 - Excel format
 - Lack of IT, Lab, & HIMS support
 - Unable to identify
 - Facility-affiliated outpatient locations
 - NHSN location- “location” field in NHSN data (your code)

Data Review Findings

Lab ID Events

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□ Admission & coding analysis

LabID Events Q1&2 2014			
LabID Event Type	Reported to NHSN	NHSN/HSCRC Stay Verified	HSCRC ICD-9-CM Infection Codes
CDIF Toxin positive stool specimens	3,334	3,136 (94.1%)	2,670 (80.1%)
MRSA <i>Blood Specimens Only</i>	583	540 (92.6%)	497 (85.3%)

- Unverified specimens → Potential reporting error
- Included in “Potential Errors” category on facility report
- Require medical record review to verify stay

Data Review Findings

LabID Events (cont.)

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□ Overview

Table 2. LabID Event Findings 1Q & 2Q 2014

LabID Type	Reported to NHSN	NHSN to HSCRC Match	NHSN to Lab Match	NHSN to Lab Errors & NHSN No Match to HSCRC or Lab	Potential Under-Reported Specimens
CDIF	3,334	3,136 (94.1%)	2,567 (67.3%)	964 (28.1%)	848 (25.4%)
MRSA	583	540 (92.6%)	447 (76.7%)	170 (29.1%)	522 (89.5%)

Data Review Findings

LabID Events (cont.)

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□ NHSN to Lab errors

LabID Events Potential NHSN to Lab Errors 1&2 Q 2014						
	NHSN to Lab Potential Errors	Specimen Not Submitted AGS for Review	No Match Collect Location	No Match Collect Date	No Match Both Spec Collect Date & Loc.	Admit Date Mismatch
CDIF	767	387 (50.4%)	268 (34.9%)	60 (8.0%)	22 (2.8%)	30 (3.9%)
MRSA	136	30 (22.0%)	39 (28.7%)	27 (19.9%)	10 (7.4%)	30 (22.0%)

Data Review Findings

LabID Events (cont.)

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□ Potential under-reported cases

LabID Events Q1&2 2014			
LabID Event Type	Potential Under-reported Cases	HSCRC CDIF & MRSA Coding w/o NHSN or Lab Specimen Match	Qualifying Lab Specimens not found in NHSN
CDIF	848	296 (35%)	552 (65%)
MRSA <i>Blood Specimens Only</i>	522	209 (40%)	313 (60%)

□ All included in potential error totals

- Cases with HSCRC coding(column 2) MR review for + specimen collection
 - Since all positive specimens were not submitted for review could not exclude
- “Qualifying specimens” included non-duplicate/unique specimens
 - Inpatient collection location
 - Facility-affiliated outpatient collection location & HSCRC data supporting admission the same day

LabID Questions

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□ Questions?



Device-Associated Reporting

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□ CAUTI & CLABSI

□ Denominator

- Patient days
- Device days
 - Same time every day
 - CLABSI NICU includes
 - Birth weight categories

□ Numerator:

- NHSN surveillance criteria
 - Diagnostic testing
 - S/S



A STATE OF MIND



NHSN Device-Associated Events Overview

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□ CAUTI & CLABSI

Table 2. Device-Associated Admission Verification		
NHSN Event Type	Reported to NHSN	NHSN Event within HSCRC Stay Verified
CAUTI	151	147 (97.4%)
CLABSI	49	49 (100%)

Data Coding Review

Device-Associated Event

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□ CC Stay, Device Insertion, & Infection

Device- Associated Coding				
CAUTI Admit Verified	CC Stay Identified	Device Insertion Coded in HSCRC Data	UTI Coded in HSCRC Data	ICD-9 CM Code 996.64
147	146 (99.3%)	5 (3.3%)	77 (51.1%)	5 (3.3%)

CLABSI Admit Verified	CC Stay Identified	Device Insertion Coded in HSCRC Data	CL Related Infection Codes in HSCRC Data	ICD-9 CM Code 999.32
49	45 (91.8%)	38 (77.6%)	11 (22.4%)	6 (12.4%)

Role of HSCRC Administrative Data Device-Associated Events

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- ❑ ICD-9 CM coding
 - ❑ Not effective in identifying potential events
 - ❑ Used with positive BC results may be moderately effective in identifying potential CLABSI events
 - ❑ Coding findings may be useful to facilities
 - ❑ Identify coding deficits
 - ❑ CC location
 - ❑ Device insertion



Recommendations

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- Process improvement
 - ▣ Best practice protocols
 - ▣ Unit-based ownership
 - ▣ Infection rates & utilization ratios posted for staff
 - Action plan when above NHSN pooled mean
- Coding deficiency
 - ▣ HIMS & physicians, nursing management investigate
 - Lack of documentation versus coding errors

Recommendations (cont.)

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- Identify stakeholders for each event type
- Education
 - ▣ All NHSN definitions and reporting guidelines
 - On-line event modules
 - NHSN IT support
- Identify key elements & assign stakeholder
- Unit based process improvement initiatives
 - ▣ Accurate documentation of key elements
 - Example: Admitting department: Admission totals by unit demonstrating outpatients housed on inpatient units are included.

Recommendations (cont.)

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- SSI Reporting Procedures & SSI events
- Capture all NHSN qualifying procedures
 - ▣ Accurate & complete list of ICD-10-CM/PSC codes
 - ▣ IT develop report of all procedures
 - ▣ SS primary stakeholder
 - Responsible for denominator submission
 - PI procedure coding, pre-intra & post perioperative documentation
 - ▣ Electronic system rep
 - Demonstrate definitions & procedures are incorporated

Recommendations (cont.)

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- SSI surveillance
 - ▣ IT develop electronic reports readmission 30/90 days
 - ▣ IP alert from HIMS when procedure & diagnosis codes suggestive of potential SSI are coded
 - ▣ All staff report suspected SSI to IP
 - ▣ Wound & tissue cultures
- Post- discharge surveillance
 - ▣ IP report suspected SSI back to index facility
 - ▣ Medical staff office
 - Facilitate surveys to office managers/surgeons

Recommendations (cont.)

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- LabID events
- Lab management, IT, electronic surveillance rep, & IP
 - ▣ IP identify NHSN inpatient, ED, 24 hr observation, & hospital affiliated outpatient locations
 - Use to develop reports and archiving data
 - ▣ Lab, IT demonstrate to IP
 - Key elements are accurate according to NHSN definitions
 - Why weren't all positive specimens retrievable
 - ? Specimen collection location accuracy for some facilities
 - ▣ Develop electronic reports specific for CDIF & MRSA
 - Based on reporting definitions

Recommendations (cont.)

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- Device-associated events
- Review denominator collection processes
 - ▣ Patient and device days
 - Collected same time each day
 - Unit-based responsibility
 - Electronic collections that provide a 24 hr total instead of a snapshot in time are **not valid for NHSN reporting**
 - Electronic collection must be manually validated
 - Does the facility meet the criteria to allow the use of the new NHSN weekly device day reporting option?
 - Recommend internal validation of this option before incorporating into NHSN reporting
 - Under-reporting device days negatively impacts infection rates

Conclusion

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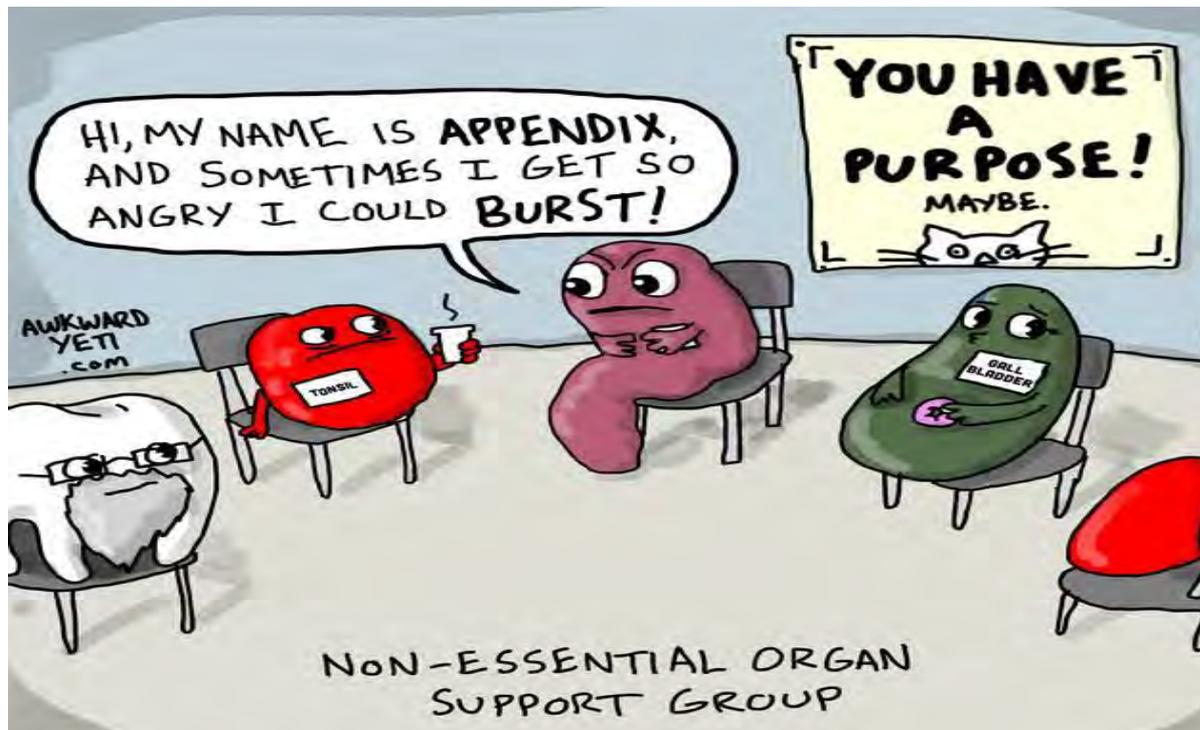
- MHCC intends to coordinate the promotion of
 - ▣ Greater facility-level interdepartmental involvement in HAI surveillance
 - ▣ Collaboration among facilities to share best practice processes



Appendix Index

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- Abbreviations
- Audit Processes
- ICD-9-CM diagnosis & procedure codes potential SSI detection



Abbreviations (cont.)

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- AHA-American Hospital Association
- APIC-Association for Professionals in Infection Control and Epidemiology
- CAUTI-Catheter-Associated Urinary Tract Infection
- CBGB- Coronary Artery Bypass Graft Both Chest and Donor Site Incisions
- CBGC- Coronary Artery Bypass Graft Chest Incision Only
- CC-Critical Care
- CDC-Centers for Disease Control and Prevention

Abbreviations (cont.)

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- CDI-*Clostridium difficile* Infection
- CDIF-*Clostridium difficile*
- CL-Central Line
- CMS-Centers for Medicare & Medicaid Services
- COLO-Colon Surgery
- CPT-Current Procedural Terminology
- CLABSI-Central Line-Associated Bloodstream Infection
- DIP- Deep incisional primary
- FAH-Federation of American Hospitals

Abbreviations (cont.)

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- ICD-International Classification of Diseases
- HAI-Healthcare-Associated Infection
- HPRO-Hip Prosthesis Surgery
- HSCRC-Health Services Cost Review Commission
- HYST-Abdominal Hysterectomy
- IP-Infection Preventionist
- KPRO-Knee Prosthesis Surgery
- Lab-Laboratory
- LabID-Laboratory-Identified
- MHCC-Maryland Health Care Commission

Abbreviations (cont.)

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- ICD-International Classification of Diseases
- HAI-Healthcare-Associated Infection
- HPRO-Hip Prosthesis Surgery
- HSCRC-Health Services Cost Review Commission
- HYST-Abdominal Hysterectomy
- IP-Infection Preventionist
- KPRO-Knee Prosthesis Surgery
- Lab-Laboratory
- LabID-Laboratory-Identified
- MHCC-Maryland Health Care Commission

Abbreviations (cont.)

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- MDRO-Multi-Drug Resistant Organism
- MRN-Medical Record Number
- MRSA-Methicillin-Resistant *Staphylococcus aureus*
- NHSN-National Healthcare Safety Network
- NICU-Neonatal Intensive Care Unit
- OS-Organ Space
- SIR-Standardized Infection Ratio
- SSI- Surgical Site Infection
- UC-Umbilical Catheter
- UTI-Urinary Tract Infection

SSI Review Process

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- NHSN \leftrightarrow HSCRC (inpatient & outpatient data)
 - ▣ Procedure date within stay
 - Potential over-reported procedure & SSI
 - ▣ Verify qualifying procedure reported to NHSN was coded in HSCRC data
 - Potential over-reported procedure
 - Potential under-reported procedures
- HSCRC \rightarrow Qualifying CPT, procedure, or Infection codes
 - ▣ Potential under-reported procedure & SSI

LabID Event Review Process

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- NHSN → HSCRC
 - ▣ Specimen within stay
 - ▣ Potential over-reported specimens
- Facility Lab data ↔ NHSN & HSCRC
 - ▣ Specimen reported NHSN, with stay
 - ▣ Potential over- & under-reported specimens
- HSCRC → Infection codes
 - ▣ Potential under-reported specimens

Device-Associated Event Coding Review Process

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- NHSN ↔ HSCRC (inpatient data)
 - ▣ NHSN reported Date of event within HSCRC stay
 - ▣ CC stay verified
 - ▣ Infection Coded
 - ▣ Device insertion coding
 - NHSN
 - Org ID, MRN, DOB, Date of event
 - HSCRC
 - CCN, Org ID, MRN, DOB, CC stay, diagnosis codes indicating device insertion, and infection

□ Infection codes for COLO & HYST potential SSI

ICD-9-CM	Description
86.04	Skin and subcutaneous I&D NES
86.22	Excisional debridement of wound, infection, burn
86.28	Non-excisional debridement of wound, infection, burn
567.21	Peritonitis (acute) generalized- male
567.22	Peritoneal abscess: abdominopelvic, mesenteric, omentum, peritoneum
567.29	Other suppurative peritonitis
567.38	Pelvic abscess
569.5	Intestinal abscess
569.61	Infection of colostomy or enterotomy
569.81	Fistula of intestine
614.5	Acute or unspecified pelvic peritonitis, female
682.2	Other cellulitis and abscess-trunk

□ Infection codes for COLO & HYST potential SSI

ICD-9-CM	Description
38.4	Septicemia due to gram-negative organism, unspecified
38.42	Septicemia due to gram-negative organism, <i>E. coli</i>
38.43	Septicemia due to gram-negative organism, <i>Pseudomonas</i>
38.49	Septicemia due to gram-negative organism, <i>other</i>
38.9	Septicemia, unspecified
54.00	Incision and drainage of abdominal wall
54.12	Reopening of recent laparotomy site
54.19	Drainage of intraperitoneal abscess or hematoma
54.91	Percutaneous abdominal drainage
70.12	Culdotomy
70.14	Other vaginotomy

ICD-9-CM Diagnosis Codes

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□ Infection codes for all procedure types

ICD-9-CM	Description
998.31	Disruption or dehiscence of closure of internal operation (surgical wound)
998.32	Disruption or dehiscence of closure of external operation (surgical wound)
998.5	Postoperative infection
998.51	Infected postoperative seroma
998.59	Other postoperative infection
998.6	Non-healing surgical wound, persistent post operative fistula
998.83	Non-healing surgical wound
998.9	Unspecified complication of procedure, not elsewhere classified

ICD-9-CM Diagnosis Codes (cont.)

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□ Infection codes for specific procedure types

ICD-9-CM	Description
711.05	Pyogenic arthritis pelvic region, thigh
711.06	Pyogenic arthritis lower leg
995.91	Sepsis without acute organ dysfunction
995.92	Severe sepsis
996.6	Infection and inflammatory reaction due to internal prosthetic device, implant, and graft
996.61	Infection and inflammatory reaction due to cardiac device, implant, graft
996.66	Infection and inflammatory reaction due to internal joint prosthesis
996.67	Infection and inflammatory reaction due to internal orthopedic device, implant
997.49	Complication of internal anastomosis of : gastrointestinal tract