Using NHSN Data Validation for Improved CDI & MDRO Surveillance and Prevention

100-Hospital Validation Project Summary, 2011
(Updated to Reflect 2013 NHSN Changes)

HAI Liaison Program
Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health
Today’s Presentation

1. Review the attributes of quality surveillance
2. Identify best practices for CDI and MDRO case-finding
3. Review NHSN CDI / MDRO surveillance protocols and definitions, targeting key issues identified during validation
4. Demonstrate CDI and MDRO BSI data validation processes and forms for internal use by hospitals
Quality Surveillance for HAI

Requires

- Consistency
- Coordination
- Confidence
- Compassion
## Consistency

Complete case-finding requires a comprehensive evaluation of a minimum clinical data set

<table>
<thead>
<tr>
<th>Always Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CDI</strong></td>
<td>Identify all <em>C. difficile</em> toxin positive tests (PCR, assay, culture)</td>
</tr>
</tbody>
</table>

| **MRSA BSI** | Identify all final *S. aureus*-positive blood cultures resistant to oxacillin, methicillin, or cefoxitin and/or other MRSA+ blood tests | If positive MRSA or VRE blood from ED or outpatient, assess if patient was admitted to hospital same day |

| **VRE BSI** | Identify all final *Enterococcus* -positive blood cultures resistant to vancomycin and/or other VRE+ blood test |  |
Coordination

- HAI surveillance needs to be a shared responsibility across hospital units, services, and disciplines
Confidence

✓ Know the MDRO/CDI protocol for Lab D surveillance
✓ Apply rules with confidence the same way every time
✓ Seek assistance as needed
Compassion

- Patients want to feel safe
- Patient advocates want to know providers are doing everything possible to prevent infections
- Identify every HAI to guide prevention and monitor progress over time
Quick Review of NHSN Reporting Rules for CDI, MRSA BSI, VRE BSI

For LabID inpatient surveillance:

- Report every positive lab test from inpatients and from ED/outpatient if admitted same calendar day
  - Ignore positive lab tests done in outpatient settings if patient not admitted
- Do not report another of the same positive lab if from same patient on the same hospital unit until >14 days after previous
  - If patient transferred to new unit, report repeat positive tests
  (Note: These won’t be included as new cases in NHSN rate calculations)
## Validation Findings by Infection Type

<table>
<thead>
<tr>
<th></th>
<th>CDI</th>
<th>MRSA BSI</th>
<th>VRE BSI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description of labs reviewed</strong></td>
<td>ED &amp; inpatient <em>C. difficile</em> toxin-positive tests, 3 mo.</td>
<td>ED &amp; inpatient MRSA positive bloods, 3 mo.</td>
<td>ED &amp; inpatient VRE positive bloods, 3 mo.</td>
</tr>
<tr>
<td><strong>Labs reviewed by validators</strong></td>
<td>3000</td>
<td>1300</td>
<td>239</td>
</tr>
<tr>
<td><strong>Reported by hospitals</strong></td>
<td>2172</td>
<td>442</td>
<td>112</td>
</tr>
<tr>
<td><strong>Reported in error</strong> (should <em>not</em> have been reported)</td>
<td>55</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td><strong>Not identified by hospital</strong> (should have been reported)</td>
<td>221</td>
<td>150</td>
<td>41</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>90%</td>
<td>74%</td>
<td>73%</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>92%</td>
<td>98%</td>
<td>96%</td>
</tr>
<tr>
<td><strong>PPV</strong></td>
<td>97%</td>
<td>97%</td>
<td>96%</td>
</tr>
</tbody>
</table>
## Cases Reported in Error

<table>
<thead>
<tr>
<th>Reason should not have been reported</th>
<th>55 of 2172 “CDI” reported did not meet NHSN criteria</th>
<th>15 of 442 “MRSA BSI” did not meet NHSN criteria</th>
<th>4 of 112 “VRE BSI” reported did not meet NHSN criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific info not captured on validation forms - 22 For remaining 33, reasons were: Test prior to patient admission date - 19 ER specimen, patient not admitted - 6 Not CDI toxin+ per final lab result - 5 &lt;14 days since prior - 2* Patient &lt;1 year old - 1*</td>
<td>19 ER specimen, patient not admitted - 6 Test prior to patient admission date - 5 Not MRSA per final lab result - 2 Specific info not captured - 2</td>
<td>Not VRE per final lab result - 2 ER specimen, patient not admitted - 1 &lt;14 days since prior - 1*</td>
<td></td>
</tr>
</tbody>
</table>

*may be ok if on different unit than previous positive; validation process mistake
## Cases Missed, Should Have Been Reported

<table>
<thead>
<tr>
<th>Reason Missed</th>
<th>Cases Missed</th>
</tr>
</thead>
</table>
| **221 additional CDI identified** | Ruled duplicate but >14 days since last CDI - 17  
ER specimen, thought patient not admitted - 11  
Missed* - 193 |
| **42 additional MRSA BSI identified** | ER specimen, thought patient not admitted - 2  
Missed* - 40 |
| **41 additional VRE BSI identified** | Not in IP surveillance lab report - 4  
ER specimen, thought patient not admitted - 2  
Reported only as CLABSI - 2  
Delayed MICs - 2  
Missed* - 31 |

* Specific details not captured on validation forms
### Assessing Accuracy of Reported Data

<table>
<thead>
<tr>
<th>Inaccurately reported fields</th>
<th>CDI</th>
<th>MRSA BSI</th>
<th>VRE BSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location attribution</td>
<td>30</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Specimen/onset date</td>
<td>1</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Admission date</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

- **No. reported cases reviewed**
  - CDI: 1762
  - MRSA BSI: 293
  - VRE BSI: 102
- **Accurate on all fields reviewed**
  - CDI: 88%
  - MRSA BSI: 89%
  - VRE BSI: 87%
Improving CDI Surveillance
CDI Surveillance

- LabID method is a nationally-recognized quality measure for the surveillance of CDI (NQF endorsed)
- Requires no clinical review or further evaluation of positive lab finding
- Facility-wide Inpatient LabID surveillance must be in your monthly reporting plan per CA reporting requirements
  - Report ALL *C. difficile* toxin-positive tests from inpatients, and from ED/outpatients if admitted to your hospital the same calendar day
Decision-making algorithm to determine if a positive CDI test should be reported to NHSN

**Note:** You are required to report CDI if test done when patient is in a new hospital location even if less than 14 days since previous positive CDI test.

(Previous training by our HAI Liaison team has not emphasized this NHSN protocol requirement)
### CDI LabID Surveillance

- NHSN algorithm categorizes CDI cases according to the admission and testing dates you enter.

<table>
<thead>
<tr>
<th>Community-Onset (CO)</th>
<th>For Inpatient surveillance, a LabID event collected ≤3 days after admission to the facility (i.e., days 1, 2, 3 or admission)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Facility-Onset (HO)</td>
<td>LabID event collected &gt;3 days after admission to the facility (on or after day 4)</td>
</tr>
</tbody>
</table>

| Community-Onset Healthcare Facility - Associated (CO-HCFA) | LabID event collected from a patient who was discharged from the facility ≤4 weeks prior to current date of stool specimen collection |
Same, Recurrent, or New CDI?

• Tracked in NHSN
  ▫ Considered the same infection if a new CDI test reported for a patient on another hospital unit within 2 weeks of previous CDI test (not included in rate calculations)
  ▫ Considered a recurrent infection if new positive CDI test greater than 2 weeks but less than 8 weeks after last CDI event reported for that patient
  ▫ Considered a new infection if new CDI positive test greater than 8 weeks since previous

• There is no advantage to not entering cases, regardless of what you know of patient’s history with CDI
To report or not report?

- Was the specimen collected in the ED or in an outpatient setting on a different day than admission?
  - Don’t report. Only exception is if you are also doing outpatient surveillance (would be reported for outpatient location, ED). Remember, because you are required to do inpatient surveillance, you must ALSO report the 1\textsuperscript{st} inpatient positive.

- We found a positive test that should be reported, but then realized we failed to report the 1\textsuperscript{st} positive specimen. What should we do?
  - Report. But go back and report the 1\textsuperscript{st} test date. Do not record a 2\textsuperscript{nd} positive from the same unit until $\geq 14$ days from previous.

- What about a patient known to have a recent history of CDI (or other reportable MDRO)?
  - Report. ALL non-duplicate specimens should be reported, regardless of history
CDI Reporting Tips

- Check for prior positives before entering a CDI Event into NHSN
  - Prevents you from inadvertently reporting “the 2\textsuperscript{nd} event” when in fact the first positive CDI was missed
- Until you are sure of completeness, do not rely on only one source (e.g. daily reports) for your CDI data
  - Ask lab to run a monthly retrospective report of final results
- Enter all toxin-positives, including those from patients with a history of \textit{C difficile}
  - Not JUST because of mandates; rather you need to know for your prevention efforts
Improving Completeness of CDI Reporting

Ensure you have identified and reported all CDI

- Ask your lab to run a retrospective line list of toxin-positive *C. difficile* for a given time period
  - i.e. the previous month or quarter
  - Sort by patient name or ID

- Using NHSN Analysis, run a line list of all CDI LabID events you reported in the same time period

- Compare the lists
Improving Accuracy of CDI Reporting

Verify that CDI are being attributed to the correct inpatient location

- Enter location where patient was when CDI specimen was collected
- If the CDI specimen was collected in the ED or other outpatient setting and the patient is admitted to the facility on the SAME date, report the location as the admitting inpatient location
- NHSN 2 calendar day “transfer rule” does not apply for LabID events

Updated to Reflect 2013 NHSN Changes
Improving MDRO BSI Surveillance
**Difference Between CLABSI and MDRO BSI Surveillance and Reporting**

**CLABSI** surveillance follows the protocol in the NHSN Device-Associated Module

- Requires positive blood culture plus review of clinical symptoms to ensure case definition is met
- CLABSI by definition are primary bloodstream infections

**MRSA/ VRE-BSI** surveillance follows LabID method in NHSN MDRO/ CDI Module

- Requires only the positive blood culture to meet the case definition for a LabID event
- Both primary and secondary bloodstream infections are included
When MRSA or VRE is the pathogen causing CLABSI, you must report the event twice to capture in both the **Device-Associated** and **MDRO/ CDI** Modules.
Improving MRSA/VRE Reporting

• Follow same reporting rules as for LabID CDI surveillance
• Check communications with your lab
• Verify data you are receiving from your lab are complete and final culture results
• Compare your daily lab reports to an end of month lab summary on all ED and inpatient MRSA/VRE BSI
Improving MRSA/VRE Reporting (continued)

- Cases may be missed if unclear description of MDRO status on lab reports
  - Ask lab to report out MDROs as “MRSA” or “VRE” rather than relying on IP/HCPs review of the susceptibility profile
  - Work with lab so positive specimen results are straightforward
  - An unclear MDRO status can affect not only surveillance and reporting but also treatment, isolation, and cleaning practices
Improving MRSA/VRE Reporting (continued)

• Know how data are exchanged between laboratory system and third party surveillance software system (e.g. Medmined, Safety Surveillor)
  
  • Be aware of settings and filters used by third party software; may filter out data that should be reported to NHSN/CDPH
    - Duplicates: Must report cases if >2 wks from previous -OR- if patient has moved to a new hospital unit since last positive
    - CO cases: Some systems filter out positive blood cultures in first 48 hours after admission; must report all
  
  • Filters can vary for the same software (even within a hospital system!)
  
  • Check data from third party software sources against reports printed directly from your laboratory
Reporting and Using Surveillance Data

Remember that the “power of surveillance is in sharing findings with those who need to know and who can act on the findings to improve patient safety”

- Plan for distribution of surveillance data and findings
- Use NHSN analysis features to review and interpret your data
- Report to the health care providers most able to impact patient care
- Report in a manner to stimulate process improvement
  - Use visual displays of data - charts, graphs, tables
Data Validation Process Review

Refer to CDI and MRSA/VRE Forms
Healthcare Associated Infections (HAI) Program

The Healthcare Associated Infections (HAI) Program is one of three programs in the Center for Health Care Quality of the California Department of Public Health. The Program is responsible for the surveillance, reporting, and prevention of infections in California's general acute care hospitals as mandated by Senate Bills 739, 1056, and 156. The Program was authorized in December 2009. HAI's are the most common complication of hospital care and are listed among the top ten leading causes of death in the United States. It is estimated that each year there are more than 1.7 million infections, 99,000 deaths, and $31 billion dollars in excess healthcare costs in acute care hospitals alone. Based on this data it is estimated that approximately 200,000 infections occur in California each year with an annual cost of about $600 million - $1.6 billion. The vision of the HAI Program is to eliminate HAIs for California patients.

Healthcare Associated Infections

New HAI Information and Reports
Links to All Pages on HAIs and Mandatory Public Reporting

Healthcare Associated Infections - Advisory Committee

New HAI-AC Recruitment Page

Information for Infection Prevention Programs

New Using NHSN Data Validation for Improved HAI Surveillance and Prevention (New Page)
New Using NHSN Analysis for Prevention Guidance Series

Public Reporting - Healthcare Associated Infections

New My Hospital - Healthcare Associated Infections Interactive Map

New Central Line associated Bloodstream Infection (CLABSI) 2011
New Methicillin-resistant Staphylococcus aureus (MRSA) and Vancomycin-resistant Enterococcus (VRE) 2011
New Surgical Site Infections 2011
New Clostridium difficile Infection (CDI)
2011 data will be published soon

Public Reporting – Prevention Measures

New Central Line Insertion Practices (CLIP)

Antimicrobial Resistance

New California Antibiotic Project

Contact

New HAI Program

Influenza Information

New Healthcare Personnel Influenza Vaccination

New Influenza Vaccination Information for Consumers

Resources

New Selected links to the Association of Professionals in Infection Control and Hospital Epidemiology (APIC)
New Selected links to the Centers for Disease Control and Prevention (CDC)
New Selected links to the Society for Healthcare Epidemiology of America (SHEA)
Questions?

Email

InfectionControl@cdph.ca.gov

or

Your designated HAI Liaison IP

FirstName.LastName@cdph.ca.gov

Lynn.Janssen@cdph.ca.gov