Carbapenem-resistant Enterobacteriaceae (CRE) Surveillance

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Objectives

- Review initial findings from CRE laboratory capacity survey
- Discuss future reporting of CRE in North Carolina
- Review ongoing CRE sentinel surveillance activities in NC
- Consider opportunities for targeted surveillance
Public Health Significance of Carbapenemase Producing CRE

• “Urgent public health threat” – CDC

• Highly resistant

• >9,000 healthcare-associated infections each year

• Up to 50% mortality

• Mobile resistance elements
CP-CRE Nationally Notifiable

- Improved detection
- Track trends and spread over time
- Rapid response and containment
- Prevention and control

Detect → Contain → Prevent → Detect
Laboratory variability in detection

Which laboratory results are considered reportable is determined by whether a laboratory has the capability to detect CP-CRE or not.
Laboratory Capacity Survey - Preliminary Findings
Primary and secondary detection methods

### Primary Method: (n=48)

<table>
<thead>
<tr>
<th>Method</th>
<th>Cases</th>
<th>Kirby-Bauer</th>
<th>Modified Hodge - meropenem</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Method: AST</td>
<td>31</td>
<td>1</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Secondary: E-test</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secondary: PCR</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secondary: Reference Lab</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secondary: Repeat test</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secondary: Do not Confirm</td>
<td></td>
<td>13</td>
<td>13</td>
<td>10</td>
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</table>

### Secondary: (n=48)

<table>
<thead>
<tr>
<th>Method</th>
<th>Cases</th>
<th>E-test</th>
<th>PCR</th>
<th>Reference Lab</th>
<th>Repeat test</th>
<th>Do not Confirm</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Hodge - meropenem</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>13</td>
<td>10</td>
</tr>
</tbody>
</table>
Ability to test for carbapenemase production?

Only 14 of 61 surveyed facilities can test for CP production
– 12 of 14 Modified Hodge Test
Burden of CRE (n=31)

• Average 7.3 non-duplicate CREs in the previous calendar year
• Range 0 – 49
• 23 of 28 (75%) reported at least one CRE
  – 72% reported at least one CRE in 2013 survey
16 of 49 (36%) reported no additional action following CRE identification

<table>
<thead>
<tr>
<th>ACTION</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>16</td>
</tr>
<tr>
<td>One or more</td>
<td>33</td>
</tr>
<tr>
<td>N/A</td>
<td>12</td>
</tr>
</tbody>
</table>
Public Health Action

If a CRE was identified in your laboratory, what further actions would your laboratory routinely take? (n=33)

- Notify IP: 79%
- Notify Nursing Station: 64%
- Notify Physician: 52%
- Notify LHD: 36%
- Notify Public Health Lab: 36%
- Test for CP: 64%
Potential barriers to your facility reporting?

• 5 “Yes”
  – IT concerns
  – Microbiology not performed in house
  – Training

What about....

• Adopting current MIC Breakpoints?
• Differing case definitions?
• Testing capabilities?
• Isolate submission?
Laboratory variability

- Which laboratory results are considered reportable is determined by whether a laboratory has the capability to detect CP-CRE or not.

1. Laboratories with the capacity to detect carbapenemase producing CRE (CP-CRE) to report Enterobacter spp, E.coli or Klebsiella spp positive for a known carbapenemase resistance mechanism or positive on a phenotypic test for carbapenemase production directly to the NC Division of Public Health.

2. Laboratories without the capacity to detect CP-CRE to report Enterobacter spp, E.coli or Klebsiella spp resistant to any carbapenem directly to the NC Division of Public Health.

3. Clinicians to report to public health authorities a person whose healthcare record contains a diagnosis of CRE, CP-CRE, KPC, NDM, OXA-48, IMP or VIM or novel carbapenemase.
Next Steps

• Final analysis of survey
• Fiscal note
• Rule change
• Build NCEDSS module
• Need to revisit any CRE guidance here in NC?

• In the mean time.....
CRE activities in NC

• Outbreak response
• Sentinel event investigations
• Education
• Mechanism testing
• Colonization screening
• Special projects
  – Targeted surveillance
  – Non-big three surveillance