Investigation of KPC-Producing Carbapenem Resistant Enterobacteriaceae (CRE) in a Skilled Nursing Facility—Pennsylvania, 2016

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Sharon Watkins, PhD
The call in October 2016

- Several residents diagnosed with Carbapenem-resistant Enterobacteriaceae (CRE)
- On-site investigation
- Suboptimal infection control practices
- Recommendations made
A case was defined as a specimen positive for CRE from any body site during 2016 in a facility resident.

<table>
<thead>
<tr>
<th>Date of first positive</th>
<th>Case count</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>1</td>
</tr>
<tr>
<td>June</td>
<td>1</td>
</tr>
<tr>
<td>July</td>
<td>1</td>
</tr>
<tr>
<td>September</td>
<td>1</td>
</tr>
<tr>
<td>October</td>
<td>1</td>
</tr>
<tr>
<td>November</td>
<td>1</td>
</tr>
<tr>
<td>Total in 2016</td>
<td>6</td>
</tr>
</tbody>
</table>
Follow up laboratory testing

- Rectal surveillance specimens
  - 7 residents who had CRE-positive roommate in the past 2 years
  - 4 residents with a history of CRE

- Urine specimens
  - 3 recent CRE isolates from clinical lab

- Specimens sent to CDC
  - Culture
  - Mechanism testing
  - PFGE
Laboratory results

- 1 colonized roommate identified
- All specimens KPC-CRE
- PFGE
  - 2 pattern clusters
  - Unrelated patterns
December 2016

- Rectal screening specimens collected from 77 of 88 (88%) residents
  - Sent to ARLN laboratory (NY) for KPC detection
- 1 additional case of CRE
Point Prevalence Survey

- 13 additional KPC-colonized residents identified
- 21 total cases of KPC-CRE in 2016
Cohort analysis

- Data obtained from medical records
  - Sent to us from the facility staff

- Only included residents eligible for the point prevalence survey (not previously identified cases)
## Cohort analysis

<table>
<thead>
<tr>
<th></th>
<th>Non-colonized</th>
<th>Colonized</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n(%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of MDRO</td>
<td>11(17%)</td>
<td>6(46%)</td>
<td>0.026</td>
</tr>
<tr>
<td>Room on Wing A</td>
<td>26(41%)</td>
<td>11(85%)</td>
<td>0.005</td>
</tr>
<tr>
<td>Indwelling urinary catheter</td>
<td>3(5%)</td>
<td>1(8%)</td>
<td>0.531</td>
</tr>
</tbody>
</table>

*Fisher’s Exact Test

**Not shown:** age, sex, length of stay, antibiotic exposure in previous 6 months, number of antibiotics in previous 6 months, dementia diagnosis, dementia with behavioral problems, incontinence, limited mobility, hospital admission in previous 12 months
Current residents only:

<table>
<thead>
<tr>
<th>Room Location</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>39a</td>
<td>39a</td>
<td>40a</td>
</tr>
<tr>
<td>39b</td>
<td>39b</td>
<td>40b</td>
</tr>
<tr>
<td>37a</td>
<td>36a</td>
<td>56a</td>
</tr>
<tr>
<td>37b</td>
<td>36b</td>
<td>56b</td>
</tr>
<tr>
<td>33a</td>
<td>34a</td>
<td>54a</td>
</tr>
<tr>
<td>33b</td>
<td>34b</td>
<td>54b</td>
</tr>
<tr>
<td>28a</td>
<td>26a</td>
<td>42a</td>
</tr>
<tr>
<td>28b</td>
<td>26b</td>
<td>42b</td>
</tr>
<tr>
<td>24a</td>
<td>22a</td>
<td>44a</td>
</tr>
<tr>
<td>24b</td>
<td>22b</td>
<td>44b</td>
</tr>
<tr>
<td>22a</td>
<td>22b</td>
<td>46a</td>
</tr>
<tr>
<td>22b</td>
<td>22b</td>
<td>46b</td>
</tr>
</tbody>
</table>

- **Clinical**: Yellow
- **Colonized**: Purple
• Multiple importations and intra-facility transmission likely occurred
• Rectal screening for CRE upon admission to facility recommended
• ARLN CRE colonization screening and further analysis is helpful
• CDC CRE Toolkit Guidelines should be followed for CRE infection control
Acknowledgements

- **PADOH**
  - Cara Bicking Kinsey
  - Aaron Smee
  - Allison Longenberger
  - Sharon Watkins
  - Jeff Miller
  - Barbara Bruen
  - Shannon Knight
  - Patrick Mitchell
  - Lisa Dettinger
  - Brigitte Husband

- **Wadsworth Laboratory**
  - Elizabeth Nazarian
  - Kimberlee Musser

- **CDC**
  - Maroya Walters
  - Heather Moulton-Meissner
  - Kathy Seiber
  - Shannon Keckler
  - Bola Ogundimu

Please contact PA HAI team at **RA-DHHAI@pa.gov** for further questions