Understanding Non-Ventilator-Associated Pneumonia and Other Lower Respiratory Infections

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Overview

- **How common is non-ventilator associated (healthcare-associated) pneumonia?**
  - Healthcare-associated infections point prevalence survey findings

- **What are the clinical correlates of events detected using surveillance definitions of pneumonia and lower respiratory infections?**

- **Next steps—facilitated discussion**
  - What are the additional surveillance needs?
  - How do we approach prevention of these events in healthcare settings?
National Healthcare Safety Network Surveillance Definitions

- **PNEU (pneumonia)**
  - Definitions require radiographic evidence, combination of signs/symptoms; microbiologic evidence optional
  - **VAP (2013):** PNEU event where the patient is on mechanical ventilation for >2 calendar days on the date of event, and the ventilator was in place on the date of event or the day before.

- **LRI (lower respiratory infection)**
  - **BRON (bronchitis, tracheobronchitis, etc.):** requires 2 signs/symptoms plus lab evidence, WITHOUT radiographic evidence of pneumonia
  - **LUNG (empyema, abscess, etc.):** requires pleural fluid or lung tissue laboratory evidence, or evidence from imaging or surgery
What are the clinical correlates of events detected by PNEU and LRI definitions?

- Chart review of cases reported to NHSN from selected hospitals in Pennsylvania
- Reviewed sample of adult and pediatric patients reported to have PNEU or LRI
  - Verified that appropriate surveillance definition fulfilled
  - Recorded clinical diagnosis documented by physician
- 250 events from 2011–2012 reviewed:
  - 101 of reported pediatric cases (40.6%)
  - 149 of reported adult cases (25.3%)
Preliminary Results: Pediatric Evaluation

- Types of events reported (101 total reviewed)
  - 66 LRI
  - 35 PNEU

- Results of CDC review:
  - 61 LRI
  - 36 PNEU
  - 4 meeting neither definition (excluded)

- Total events available for further analysis: 97
## Preliminary Results: Pediatric Diagnoses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>LRI, n (%) (N=61)</th>
<th>PNEU, n (%) (N=36)</th>
<th>All cases, n (%) (N=97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchiolitis</td>
<td>3 (4.9)</td>
<td>0 (0)</td>
<td>3 (3.1)</td>
</tr>
<tr>
<td>Chronic lung disease</td>
<td>2 (3.3)</td>
<td>0 (0)</td>
<td>2 (2.1)</td>
</tr>
<tr>
<td>Healthcare-associated pneumonia</td>
<td>5 (8.2)</td>
<td>23 (63.9)</td>
<td>28 (28.9)</td>
</tr>
<tr>
<td>Pneumonitis</td>
<td>3 (4.9)</td>
<td>2 (5.6)</td>
<td>5 (5.2)</td>
</tr>
<tr>
<td>Possible infection</td>
<td>0 (0)</td>
<td>2 (5.6)</td>
<td>2 (2.1)</td>
</tr>
<tr>
<td>Respiratory infection, site not certain</td>
<td>3 (4.9)</td>
<td>4 (11.1)</td>
<td>7 (7.2)</td>
</tr>
<tr>
<td>Tracheitis/Tracheobronchitis</td>
<td>25 (41.0)</td>
<td>2 (5.6)</td>
<td>27 (27.8)</td>
</tr>
<tr>
<td>Unclear</td>
<td>1 (1.6)</td>
<td>1 (2.8)</td>
<td>2 (2.1)</td>
</tr>
<tr>
<td>Other*</td>
<td>3 (4.9)</td>
<td>0 (0)</td>
<td>3 (3.1)</td>
</tr>
<tr>
<td>Multiple**</td>
<td>3 (4.9)</td>
<td>1 (2.8)</td>
<td>4 (4.1)</td>
</tr>
<tr>
<td><strong>No diagnosis documented</strong></td>
<td>13 (21.3)</td>
<td>1 (2.8)</td>
<td>14 (14.4)</td>
</tr>
</tbody>
</table>

*Other includes culture-negative sepsis, infected pleural effusion, and upper respiratory infection

**Multiple diagnoses included “respiratory failure and pleural effusion,” “Tracheitis and atelectasis,” “Tracheitis and pneumonia,” and “RSV bronchiolitis and culture-negative sepsis”
Adult Evaluation

- Types of events reported (149 total reviewed)
  - 53 LRI
  - 96 non ventilator-associated PNEU

- Results of CDC review:
  - 43 LRI
  - 81 non ventilator-associated PNEU
  - 16 VAP (excluded)
  - 9 met neither definition (excluded)

- Total events available for further analysis: 124
## Preliminary Results: Adult Diagnoses

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>LRI, n (%) (N=43)</th>
<th>PNEU, n (%) (N=81)</th>
<th>All cases, n (%) (N=124)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARDS</td>
<td>1 (2.3)</td>
<td>1 (1.2)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>Aspiration pneumonia</td>
<td>2 (4.7)</td>
<td>13 (16.0)</td>
<td>15 (12.1)</td>
</tr>
<tr>
<td>Gross aspiration</td>
<td>2 (4.7)</td>
<td>4 (4.9)</td>
<td>6 (4.8)</td>
</tr>
<tr>
<td>Healthcare-associated pneumonia</td>
<td>13 (30.2)</td>
<td>43 (53.1)</td>
<td>56 (45.2)</td>
</tr>
<tr>
<td>Hemothorax</td>
<td>0 (0)</td>
<td>1 (1.2)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Respiratory infection, site NOS</td>
<td>2 (4.7)</td>
<td>0 (0)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>1 (2.3)</td>
<td>3 (3.7)</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Tracheobronchitis</td>
<td>3 (7.0)</td>
<td>0 (0)</td>
<td>3 (2.4)</td>
</tr>
<tr>
<td>Other*</td>
<td>4 (9.3)</td>
<td>0 (0)</td>
<td>4 (3.2)</td>
</tr>
<tr>
<td>Multiple**</td>
<td>1 (2.3)</td>
<td>9 (11.1)</td>
<td>10 (8.1)</td>
</tr>
<tr>
<td><strong>No diagnosis documented</strong></td>
<td><strong>14 (32.6)</strong></td>
<td>7 (8.6)</td>
<td>21 (16.9)</td>
</tr>
</tbody>
</table>

*Other diagnoses include COPD exacerbation, empyema, esophageal leak, “possible VAP”

** Multiple diagnoses include healthcare-associated pneumonia (HAP) and volume overload (4); ARDS/HAP, HAP/diffuse alveolar hemorrhage, sepsis and volume overload, gross aspiration/ARDS, HAP/COPD exacerbation, HAP/atelectasis (1 each)
Summary of Chart Review Experience

- Radiographic reports difficult to interpret, even for non-vent PNEU
  - Experience of chart review team similar to NHSN user feedback re: PNEU definitions
- LRI definition captures broad range of diagnoses (not specific)
- PNEU definition more closely aligns with clinical diagnosis of pneumonia
Discussion/Next Steps

- These data suggest healthcare-associated, non-ventilator-associated pneumonia may be a common entity—do these results reflect clinical experience?
- What are the additional surveillance needs?
- How do we approach prevention of these events in healthcare settings?
Acknowledgments

- PA PNEU/LRI project participating hospitals and staff
- PA Department of Health
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- CDC/DHQPP and DPEI colleagues
- Many others ...

The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention.
Thank You

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