Since 2003, New Jersey (NJ) state regulation (N.J.A.C. 8:57) requires healthcare providers, administrators, and laboratories to report confirmed cases of legionellosis within 24 hours of diagnosis to their local health department. Legionellosis includes both Legionnaire’s Disease (LD) and Pontiac Fever, however a vast majority of legionellosis cases in NJ are LD.

Since 2006, after case definition was changed, NJ rate of reported legionellosis nearly doubled from 1.39 cases per 100,000 people in 2006 to 2.71 in 2013 (Figure 1). The number of confirmed cases for NJ ranged from 116-241 per year during this time period.

For entire date range, NJ legionellosis rates have been considerably higher than the national rate, as reported by the Centers for Disease Control and Prevention (CDC). The NJ rate is 45-115% greater than rate from year to year.¹

Objectives and Methods

Objectives

- Determine if the NJ legionellosis surveillance system is currently meeting the larger goals of a surveillance system as outlined by the CDC surveillance system evaluation guidance.² Due to geographic distribution of disease and higher than average rates of legionellosis in New Jersey.
- Describe NJ legionellosis surveillance system and evaluate all nine surveillance system attributes, with focus on data quality and timeliness.

Methods

- Used “Updated Guidelines for Evaluating Public Health Surveillance Systems” as evaluation guidance.
- Analyzed qualitative data from New Jersey's electronic reportable disease system, Communicable Diseases Reporting and Surveillance System (CDRSS).

Results

Description of System

- New Jersey has 21 counties and 95 local health departments.
- Legionellosis cases are reported directly to local health departments (LHDs) and investigated under authority of the health officer.
- Investigations are conducted by communicable disease investigators, comprised mostly of public health nurses and registered environmental health specialists.
- The New Jersey Department of Health (NJDOH) provides subject matter expertise and reviews cases before closing out and transmitting to CDC.

System Attribute: Simplicity, Stability, and Acceptability

- These attributes were only descriptively assessed due to prior analysis already completed for the CDRSS system overall.
  - Simplicity: good (after brief training or prior experience with public health surveillance system)
  - Stability: great (few server outages, great connection with LHDs, healthcare facilities, and laboratories, and reliable data management/storage)
  - Acceptability: moderate (participation high, completeness/timeframe of case form often lacking)

System Attribute: Data Quality

- 1,404 legionellosis cases in NJ from 2006-2013 were analyzed for completeness of several demographic/case and sign/symptom variables (Table 1).
- Race and admission to ICU were the variables least likely to be completed. The LD clinical definition requires signs and symptoms most frequently missing include myalgia, chills, and cough.

Table 1: Missing Data for Legionellosis Case Variables, 2006-2013

<table>
<thead>
<tr>
<th>Variable</th>
<th># Missing</th>
<th>% Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Race</td>
<td>314</td>
<td>22.4</td>
</tr>
<tr>
<td>Illness Onset</td>
<td>18</td>
<td>1.3</td>
</tr>
<tr>
<td>Died</td>
<td>75</td>
<td>5.3</td>
</tr>
<tr>
<td>Admitted to ICU</td>
<td>604</td>
<td>43.0</td>
</tr>
<tr>
<td>Signs and Symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>73</td>
<td>5.2</td>
</tr>
<tr>
<td>Chills</td>
<td>946</td>
<td>67.4</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>95</td>
<td>6.8</td>
</tr>
<tr>
<td>Cough</td>
<td>946</td>
<td>31.8</td>
</tr>
<tr>
<td>Myalgia</td>
<td>1267</td>
<td>90.2</td>
</tr>
</tbody>
</table>

System Attribute: Sensitivity

- Likely very high due to both specificity of diagnostic tests and case review by NJDOH.
  - Urine antigen test very specific for Legionella pneumophila serogroup one³, and this test used in 96% of reported NJ cases.
  - Before case is confirmed, it is reviewed at state level.

System Attribute: Predictive Value Positive

- Typically very high due to both specificity of diagnostic tests and case review by NJDOH.

System Attribute: Flexibility

- The ability for the legionellosis surveillance system to change is largely limited.
  - For example, changing symptom variables to adapt for definition change is allowable, but adding new variables such as “healthcare association” cannot occur without major software re-design.
  - Interaction with outbreak database is very limited.

RECOMMENDATIONS

- Standardized training and case investigation protocols for LHDs, including case data entry guidelines, should be utilized for better data quality.
- Increase in electronic reporting, along with education of clinicians and laboratories, should cut down on reporting delays.
- Sensitivity of the system should be improved with education of Pontiac Fever and alternative diagnostic testing (sputum culture in addition to urine antigen test).
- The flexibility and acceptability of legionellosis surveillance system is currently being addressed by upcoming overall re-design of CDRSS; addition of outbreak features and capacity to change variables within diseases is planned.
- Also being added is the ability to differentiate cases of LD vs. Pontic Fever.
- There are restricted means of signifying outbreak investigations and healthcare associated cases within system.

References and Acknowledgements


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