ABSTRACT

Background/Objective: Environmental surveillance for Legionella has been shown to be an important tool in assessing the risk for healthcare-associated Legionnaires’ disease. Both the concentration of Legionella recovered in water from plumbing fixtures and the extent of colonization per location have been used to assess risk.

Results: Legionella pneumophila and variability of these parameters have been evaluated, but questions remain. The objective of this study was 1) determine variability in Legionella concentration and percent positivity at locations with water testing of water outlets within a hospital building and 2) evaluate changes in viability of Legionella over a time period typical for specimen transport.

Methods: Hot water from 12 sinks (hospital administrative and outpatient building) and cold water from another 12 sinks were sampled twice a week for 6 weeks for a total of 155 samples. Samples were cultured for Legionella immediately after collection (T=0) and then held at room temperature before processing (T=1, 24hr) and at 48 hr after incubation (T=48). A significant difference in Legionella concentration was observed comparing T=0 vs. 1 and 24hr (p<0.05). After 48hr recovery was slightly lower than T=0 (0.18 log CFU/mL), but this difference was less than day-to-day variability. The percentage of sites positive did not change throughout the study. The concentration of Legionella recovered varied over the study period. The average difference between the minimum and maximum for the 12 sinks over the study period was 0.58 log with 0.58 – 1.34 log differences between the minimum and maximum for the 12 sinks over the study period of water outlets within a hospital building and 2) evaluate changes in viability of Legionella over a time period typical for specimen transport.

Conclusions: Variability in Legionella recovered varied over the study period. The average difference between T=0 vs. 1 and 24hr (p<0.05). After 48hr recovery was slightly lower than T=0 (0.18 log CFU/mL), but this difference was less than day-to-day variability. The percentage of sites positive did not change throughout the study. The concentration of Legionella recovered varied over the study period. The average difference between the minimum and maximum for the 12 sinks over the study period was 0.58 log with 0.58 – 1.34 log differences between the minimum and maximum for the 12 sinks over the study period of water outlets within a hospital building and 2) evaluate changes in viability of Legionella over a time period typical for specimen transport.

RESULTS

Table 1. Effect of time on recovery of L. pneumophila from water samples

<table>
<thead>
<tr>
<th>Site</th>
<th>LOG Mean CFU/mL</th>
<th>T0</th>
<th>T1</th>
<th>T24</th>
<th>T48</th>
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<tbody>
<tr>
<td>1. 3501 Utility Sink</td>
<td>2.35</td>
<td>2.07</td>
<td>2.30</td>
<td>2.18</td>
<td>2.49</td>
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<tr>
<td>2. 4519 Sink 2</td>
<td>2.05</td>
<td>1.94</td>
<td>2.07</td>
<td>2.06</td>
<td>2.18</td>
</tr>
<tr>
<td>3. 4510 Sink 4</td>
<td>1.98</td>
<td>1.95</td>
<td>1.94</td>
<td>2.02</td>
<td>2.03</td>
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<tr>
<td>4. 4510 Sink 1</td>
<td>1.35</td>
<td>1.27</td>
<td>1.28</td>
<td>2.30</td>
<td>2.36</td>
</tr>
<tr>
<td>5. 4510 Sink 3</td>
<td>2.38</td>
<td>2.40</td>
<td>2.42</td>
<td>2.35</td>
<td>2.39</td>
</tr>
<tr>
<td>6. 5515 Sink 3</td>
<td>0.04</td>
<td>0.09</td>
<td>0.09</td>
<td>2.04</td>
<td>2.03</td>
</tr>
<tr>
<td>7. 5515 Sink 2</td>
<td>2.15</td>
<td>2.14</td>
<td>2.13</td>
<td>2.08</td>
<td>2.03</td>
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<tr>
<td>8. 5515 Sink 1</td>
<td>1.81</td>
<td>1.83</td>
<td>1.84</td>
<td>2.05</td>
<td>2.35</td>
</tr>
<tr>
<td>9. 6507 Right Sink</td>
<td>1.99</td>
<td>2.01</td>
<td>2.03</td>
<td>1.99</td>
<td>2.03</td>
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<td>1.89</td>
<td>1.91</td>
<td>1.92</td>
<td>2.00</td>
<td>2.12</td>
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<td>11. 4544 Sink 2</td>
<td>2.33</td>
<td>1.24</td>
<td>1.25</td>
<td>2.32</td>
<td>2.20</td>
</tr>
<tr>
<td>12. 11513 Sink</td>
<td>2.14</td>
<td>2.15</td>
<td>2.12</td>
<td>1.97</td>
<td>1.93</td>
</tr>
</tbody>
</table>

Table 2. No significant recovery in L. pneumophila site-to-site or day-to-day variability

<table>
<thead>
<tr>
<th>Week</th>
<th>Site</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
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</thead>
<tbody>
<tr>
<td>1. 110543 Sink 2</td>
<td>208/310</td>
<td>280/340</td>
<td>130/180</td>
<td>190/220</td>
<td>100/140</td>
<td>80/120</td>
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<tr>
<td>2. 110543 Sink 3</td>
<td>200/340</td>
<td>280/410</td>
<td>140/200</td>
<td>210/300</td>
<td>100/140</td>
<td>80/120</td>
<td></td>
</tr>
<tr>
<td>3. 110543 Sink 4</td>
<td>200/340</td>
<td>280/410</td>
<td>140/200</td>
<td>210/300</td>
<td>100/140</td>
<td>80/120</td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES


CONCLUSIONS

Legionella has been shown to be stable and maintain viability in water over long periods of time (3). In our study, there was no significant increase or decrease in Legionella viability when cultured within the time recommended from collection to processing. i.e. 48 hr of collection. Reduction in viability over time between sample collection and processing was not greater than the day-to-day variation, even at 48hr after collection.

Monitoring for Legionella from outlets (sinks) in complex building water systems is used to assess risk for disease (4). Recovery of Legionella from outlets was consistent both in log CFU/mL and proportion of sites positive in the building tested.