Neisseria meningitidis and Haemophilus influenzae Survey Brief

BACKGROUND

*Neisseria meningitidis* and *Haemophilus influenzae* are contagious vaccine preventable pathogens spread by close contact and have the potential of causing invasive disease such as meningitis. In cases of bacterial meningitis, rapid and accurate detection is necessary in order to provide proper treatment and to prevent serious sequelae.\(^1\) The isolation of *N. meningitidis* and *H. influenzae* from a normally sterile body site or the detection of *N. meningitidis* and *H. influenzae* nucleic acid in a specimen obtained from a normally sterile body site are indicative of confirmed cases according to the National Notifiable Diseases Surveillance System (NNDSS).\(^2,3\) Laboratories performing *N. meningitidis* and *H. influenzae* testing provide critical information for both clinical care and public health measures.

METHODS

In Spring 2014, APHL fielded a survey to collect information on testing methods used by public health laboratories to identify *Neisseria meningitidis* and *Haemophilus influenzae* in case patients. The impetuous behind this survey was to collect information in order to make additions to the laboratory criteria for the case definitions of *N. meningitidis* and *H. influenzae*. This 22 question survey was developed by CDC and APHL and was administered through Qualtrics, an online survey application. Survey questions focused on testing services provided at PHLs for *N. meningitidis* and *H. influenzae*. Ninety-three public health laboratories received the survey and 34 (37%) responded: 25 of 50 state laboratories and nine local public health laboratories.


RESULTS

Graph 1

Graph 1 depicts which test methods are used to test specimens for *Neisseria meningitidis* in public health laboratories. Overall, culture for *N. meningitidis* was the most common method of testing at PHLs while immunohistochemistry was not performed in any responding PHLs. *N. meningitidis* PCR is performed at 20% of the responding state PHLs.

Graph 2

Graph 2 depicts which test methods are used to test specimens for *Neisseria meningitidis* in public health laboratories. Overall, culture is the most common method for testing at both state and local public health laboratories, while immunohistochemistry was not performed. *H. influenzae* PCR is performed at 12% of responding PHLs.
Graph 3: Five state PHLs currently perform *N. meningitidis* PCR and 5 (3 state and 2 local) PHLs have plans to implement PCR in the future. Fourteen (10 state and 4 local) PHLs submit specimens to their assigned Vaccine Preventable Disease (VPD) Reference Center for *N. meningitidis* PCR.

Graph 4: Three state PHLs currently perform *H. influenzae* PCR and 3 (2 state and 1 local) PHLs have plans to implement *H. influenzae* PCR in the future. Fourteen (10 state and 4 local) PHLs refer specimens to their assigned VPD Reference Center for *H. influenzae* PCR.
Table 1

<table>
<thead>
<tr>
<th>Criteria for Performing N. meningitidis and H. influenzae PCR in Public Health Laboratories Currently Using the Test Method</th>
<th>N. meningitidis (N=5)</th>
<th>H. influenzae (N=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>PCR is done on all specimens and isolates in which disease is suspected</td>
<td>2 (40)</td>
<td>1 (33.3)</td>
</tr>
<tr>
<td>PCR is performed in place of culture</td>
<td>1 (20)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>PCR is performed on isolates cultured in house</td>
<td>3 (60)</td>
<td>1 (33.3)</td>
</tr>
<tr>
<td>PCR is performed on isolates referred to our laboratory for identification</td>
<td>4 (80)</td>
<td>2 (66.7)</td>
</tr>
<tr>
<td>PCR is performed on clinical specimens ONLY if culture is negative</td>
<td>1 (20)</td>
<td>1 (33.3)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (60)*</td>
<td>1 (33.3)*</td>
</tr>
</tbody>
</table>

Table 1 describes the responses to the questions “What criteria are used to decide if PCR is used to detect N. meningitidis in clinical specimens and/or isolates?” and “What criteria are used to decide if PCR is used to detect H. influenzae in clinical specimens/isolates?” PCR is performed primarily on isolates referred to responding laboratories.

* Other responses include: Stat isolates, molecular serogrouping, and PCR is performed on non-viable cultures received in-house.

**CONCLUSION**

PHLs play an important role in the detection of N. meningitidis and H. influenzae. Approximately 88% of responding PHLs provide testing for N. meningitidis and 85% provide testing for H. influenzae. Although there is increased availability of PCR testing methods for both N. meningitidis and H. influenzae, 73.5% of responding PHLs perform culture as the primary means to detect N. meningitidis and 76.5% perform culture as the primary means to detect H. influenzae. Ten responding PHLs (29%) either perform PCR or have plans to implement PCR for the detection of N. meningitidis while 14 (41%) responding PHLs submit specimens to their assigned VPD Reference Center for N. meningitidis PCR. Six responding PHLs (17.6%) either perform PCR or have plans to implement PCR for the detection of H. influenzae while 14 (41%) responding PHLs submit specimens to their assigned VPD Reference Center for H. influenzae PCR. Rapid and accurate detection of both N. meningitidis and H. influenzae is imperative to clinical care, case management, and outbreak control practices. Without testing at PHLs, confirmation invasive disease may go undetected. APHL will continue to monitor the landscape of public health laboratory testing of N. meningitidis and H. influenzae in order to respond to public health threats.
Association of Public Health Laboratories

The Association of Public Health Laboratories (APHL) is a national nonprofit dedicated to working with members to strengthen laboratories with a public health mandate. By promoting effective programs and public policy, APHL strives to provide public health laboratories with the resources and infrastructure needed to protect the health of US residents and to prevent and control disease globally.

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