The BioFire® Meningitis/Encephalitis Panel detects the 14 pathogens listed below, requiring only 0.2mL of cerebrospinal fluid (CSF) with optimal turnaround time of approximately 1 hour. [1]

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Virus</th>
<th>Fungus</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Escherichia coli</em> K1</td>
<td>Cytomegalovirus (CMV)</td>
<td><em>Cryptococcus neoformans/gattii</em></td>
</tr>
<tr>
<td><em>Haemophilus influenza</em></td>
<td>Enterovirus</td>
<td></td>
</tr>
<tr>
<td><em>Listeria monocytogenes</em></td>
<td><em>Herpes simplex virus 1</em> (HSV1)</td>
<td></td>
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<tr>
<td><em>Neisseria meningitidis</em></td>
<td><em>Herpes simplex virus 2</em> (HSV2)</td>
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<tr>
<td><em>Streptococcus agalactiae</em></td>
<td><em>Human herpesvirus 6</em> (HHV6)</td>
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<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td><em>Human parechovirus</em></td>
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<td></td>
<td></td>
<td>Varicella zoster virus (VZV)</td>
</tr>
</tbody>
</table>

**Indications** [2]
- >10 nucleated cells/μL of CSF from immunocompetent patients
- Suspected central nervous system (CNS) infection in an immunocompromised patient
  - HIV infection
  - immunosuppressant therapy including chemotherapy
  - solid organ or bone marrow transplant
  - aplastic anemia or primary immunodeficiency

**General Principles** [3]
- The goal of rapid diagnostic information is to swiftly and safely de-escalate empiric therapy.
- Don’t forget: Only the pathogens listed above are detected!
- BioFire® Meningitis/Encephalitis Panel is not validated for
  - patients with indwelling devices (e.g., shunts)
  - patients with antibiotic exposure prior to lumbar puncture
    - ample reports of identifying pathogens in this setting but sensitivity data is lacking

**Considerations** [4]
**Bacteria**
- 97.5% percent positive agreement (PPA)
  - does not detect non-encapsulated E. coli and N. meningitidis
  - does not detect mycobacterial infection, syphilis, tick-borne disease (e.g., Ehrlichia, RMSF), etc.

**Virus**
- 90.1% PPA
  - do not modify treatment for suspected HSV encephalitis based on negative testing
    - acyclovir should be initiated in all patients with suspected HSV encephalitis
  - repeat testing with specific PCR (e.g., HSV, Enterovirus) should be pursued if clinical suspicion is high
  - cannot differentiate active versus latent infection (e.g., HSV)
  - does not detect West Nile virus (order WNV IgM on CSF if suspected)
  - often reports HHV6 of no clinical significance
    - present in 37% of normal hosts [5] (chromosomally integrated in ≈1% of the population [6])

**Fungus**
- 92.3% PPA relative to cryptococcal fungal smear/culture but only 52% PPA relative to cryptococcal Ag
  - should not supplant CSF cryptococcal Ag testing if cryptococcal infection suspected

Always perform traditional Gram stain and culture for suspected meningitis or encephalitis! Please let Microbiology know to prioritize traditional testing if cerebrospinal fluid volume is limited.
1 https://www.biofiredx.com/filmarrayme/.