Overview

Useful For
Aiding in the diagnosis of recent infection with Chikungunya virus in patients with recent travel to endemic areas and a compatible clinical syndrome

Highlights
This test may be used as an aid to diagnose recent or past infection with Chikungunya virus (ChikV) in patients with recent travel to endemic regions and a compatible clinical syndrome.

IgM and IgG antibodies to ChikV are typically detectable 3 to 4 days and 6 to 7 days following onset of symptoms, respectively.

IgM antibodies to ChikV typically remain detectable for 3 to 4 months after infection, whereas IgG antibodies to ChikV remain detectable for years.

Profile Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIKM</td>
<td>Chikungunya IgM, Ab, S</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CHIKG</td>
<td>Chikungunya IgG, Ab, S</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CHIKI</td>
<td>Chikungunya Interpretation</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Testing Algorithm
See Mosquito-borne Disease Laboratory Testing in Special Instructions.

Special Instructions
- Mosquito-borne Disease Laboratory Testing

Method Name
Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required
Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top
Submission Container/Tube: Aliquot tube

Specimen Volume: 0.5 mL

Additional Information: Testing a patient in a convalescent period is recommended because specimens collected too early following infection may be negative for antibodies to Chikungunya virus.

Forms

If not ordering electronically, complete, print, and send a Microbiology Test Request (T244) with the specimen.

Specimen Minimum Volume

0.4 mL

Reject Due To

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross lipemia</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>Reject</td>
</tr>
</tbody>
</table>

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Refrigerated (preferred)</td>
<td>30 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>30 days</td>
<td></td>
</tr>
</tbody>
</table>

Clinical and Interpretive

Clinical Information

Chikungunya virus (ChikV) is a single-stranded RNA alphavirus and a member of the Togaviridae family of viruses. The name Chikungunya is derived from the language of the Makonde ethnic groups in southeast Africa and means "that which bends" or "stooped walk." This is in reference to the hunched-over appearance of infected individuals due to the characteristically painful and incapacitating arthralgia caused by the virus. ChikV is endemic throughout Africa, India, and more recently the Caribbean islands. In 2014, the first case of autochthonous or local transmission in the United States occurred in Florida.

Humans are the primary reservoir for ChikV and Aedes species mosquitoes are the primary vectors for transmission. Unlike other mosquito-borne viruses such as West Nile virus (WNV) and Dengue, the majority of individuals who are exposed to ChikV become symptomatic, with the most severe manifestations observed at the extremes of age and in those with suppressed immunity. Once exposed to ChikV, individuals develop lasting immunity and protection from reinfection.

Prior to development of symptoms, the incubation period ranges, on average, from 3 to 7 days. Infected patients typically present with sudden onset high fever, incapacitating joint pain, and often a maculopapular rash lasting anywhere from 3 to 10 days. Notably, symptom relapse can occur in some individuals 2 to 3 months following resolution of initial symptoms. Currently, there are no licensed vaccines and treatment is strictly supportive care.

Reference Values
IgM: Negative
IgG: Negative

Reference values apply to all ages.

**Interpretation**

**IgM and IgG Negative:**

-No serologic evidence of exposure to Chikungunya virus. Repeat testing on a new specimen collected in 5 to 10 days is recommended if clinical suspicion persists.

**IgM and IgG Positive:**

-IgM and IgG antibodies to Chikungunya virus detected, suggesting recent or past infection. IgM antibodies to Chikungunya virus may remain detectable for 3 to 4 months post-infection.

**IgM Positive, IgG Negative:**

-IgM antibodies to Chikungunya virus detected, suggesting recent infection. Repeat testing in 5 to 10 days is recommended to demonstrate anti-Chikungunya virus IgG seroconversion to confirm current infection.

**IgM Negative, IgG Positive:**

-IgG antibodies to Chikungunya virus detected, suggesting past infection.

**IgM and/or IgG Borderline:**

-Repeat testing in 10 to 14 days is recommended.

**Cautions**

Specimens collected too early following infection may be negative for antibodies to Chikungunya virus.

Chikungunya and Dengue viruses currently co-circulate in endemic areas and infections can present similarly in symptomatic patients. It is therefore recommended to evaluate at-risk patients for infection with both viruses.

**Supportive Data**

**Accuracy:**

IgM Antibodies to Chikungunya Virus:

Originally 87 serum samples tested by the Focus Diagnostics Inc. anti-Chikungunya virus IgM immunofluorescence assay (IFA) were also evaluated by the Eurolimmun anti-Chikungunya virus IgM enzyme-linked immunofluorescence assay (ELISA) and the results are indicated below.

| Comparison of the Eurolimmun ChikV IgM ELISA and the Focus Diagnostics ChikV IgM IFA |
|------------------------------------------------|---------------------------------|
| **Eurolimmun ChikV IgM** | Positive | Focus Diagnostics ChikV IgM IFA |
| Positive | 43 | Negative | 0 |
Positive Agreement: 93.5 (43/46); 95% Confidence Index (CI): 81.9%-98.4%

Negative Agreement: 100% (41/41); 95% CI: 89.8%-100%

Overall Agreement: 96.6% (84/87); 95% CI: 89.9%-99.2%

IgG Antibodies to Chikungunya Virus:

Originally 101 serum samples tested by the Focus Diagnostics Inc. anti-Chikungunya virus IgG IFA were also evaluated by the EuroImmun anti-Chikungunya virus IgG ELISA and the results are indicated below.

### Comparison of the EuroImmun ChikV IgG ELISA and the Focus Diagnostics ChikV IgG IFA

<table>
<thead>
<tr>
<th></th>
<th>Focus Diagnostics ChikV IgG IFA</th>
<th>EuroImmun ChikV IgG EIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>EurolImmun ChikV IgG EIA</td>
<td>39</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>7*</td>
</tr>
<tr>
<td></td>
<td>Borderline</td>
<td>0</td>
</tr>
</tbody>
</table>

*All 7 samples were positive by both the Focus and EuroImmun IgM assays. Also, 4 of 7 samples had low titers (< or =1:20) by the IFA assay.

Positive Agreement: 84.8 (39/46); 95% CI: 71.5%-92.7%

Negative Agreement: 90.9% (50/55); 95% CI: 80.0%-96.5%

Overall Agreement: 88.1% (89/101); 95% CI: 80.2%-93.2%

Reference Range:

Of serum samples collected from normal donors, 74/75 (98.7%) and 90/90 (100%) were negative by the EuroImmun anti-Chikungunya virus IgG and IgM assays, respectively.

Analytical Specificity:

1. Sixty serum samples previously characterized as positive for IgG-class antibodies to West Nile virus (n=29), Dengue virus (n=15), St. Louis encephalitis virus (n=8), California encephalitis virus (n=6), and Western equine encephalitis virus (n=2) were analyzed by the EuroImmun anti-Chikungunya virus IgG assay. One sample, positive for IgG antibodies to Dengue virus was also positive by the Chikungunya IgG assay, giving an overall specificity of 98.3% (59/60).

2. Thirty three serum samples previously characterized as positive for IgM-class antibodies to West Nile virus (n=8), Dengue virus (n=11), St. Louis encephalitis virus (n=6), California encephalitis virus (n=6), and Western equine encephalitis virus (n=2), were analyzed by the EuroImmun anti-Chikungunya virus IgM assay. Two samples, positive for IgM antibodies to Dengue virus were also positive by the Chikungunya IgM assay, giving an overall specificity of
Test Definition: CHIKV
Chikungunya IgM and IgG, Ab, S

93.9% (31/33).

Note: Dengue and Chikungunya virus cocirculate in endemic areas and are transmitted by the same mosquito genera, so the 3 specimens with antibodies to both viruses may indicate coinfection or past exposure to both viruses.

Clinical Reference

Performance

Method Description
For both the Chikungunya virus IgM and IgG assays, polystyrene microwells are coated with recombinant Chikungunya antigen. Diluted serum samples and controls are incubated in the wells to allow anti-Chikungunya antibodies (if present in the sample) to react with the antigen. Nonspecific reactants are removed by washing. Next, peroxidase-conjugated antihuman antibody is added to the wells and will react with human antibodies bound to the antigen. Excess conjugate is removed by washing. Enzyme substrate and chromagen are added, and the color is allowed to develop. After adding the Stop Reagent, the resultant color change is quantified by a spectrophotometric reading of optical density (OD). Sample optical density readings are compared with reference cut-off OD readings to determine the qualitative results. (Package inserts: Anti-Chikungunya virus ELISA IgG v. 19/09/2016 and IgM v. 19/09/2016, Euroimmun Ag, Seekamp 31, 23560 Luebeck, Germany)

PDF Report
No

Day(s) and Time(s) Test Performed
Tuesday; 11 a.m.

Analytic Time
Same day/1 day

Maximum Laboratory Time
7 days

Specimen Retention Time
14 days

Performing Laboratory Location
Rochester

Fees and Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
Test Definition: CHIKV
Chikungunya IgM and IgG, Ab, S

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information
IgM: 86790
IgG: 86790

LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIKV</td>
<td>Chikungunya IgM and IgG, Ab, S</td>
<td>93976-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIKI</td>
<td>Chikungunya Interpretation</td>
<td>69048-7</td>
</tr>
<tr>
<td>CHIKG</td>
<td>Chikungunya IgG, Ab, S</td>
<td>88630-9</td>
</tr>
<tr>
<td>CHIKM</td>
<td>Chikungunya IgM, Ab, S</td>
<td>88629-1</td>
</tr>
</tbody>
</table>