

**VDH Chikungunya, Dengue and Zika virus Infections - Cheat Sheet for Healthcare Providers (May 3, 2016)**

Characteristic	Chikungunya virus	Dengue fever virus	Zika virus	Comments or additional information
<b>Incubation Period</b>	3-7 days (range 2-12 days)	4-7 days (range 3-14 days)	Range 3-14 days	
<b>Signs and symptoms</b>	Fever, joint pain (usually bilateral and associated with distal joints such as the hands, feet, wrists, ankles, elbows and knees), headache, backache, muscle pain, maculopapular rash, arthritis or conjunctivitis. Rarely, neurological symptoms may occur.	Fever, headache, severe pain behind the eyes, joint, muscle and/or bone pain, rash, and mild bleeding (e.g., nose or gums bleed, petechial rash, easy bruising). Rarely, neurological symptoms may occur.	A maculopapular rash is the most common symptom, and may be accompanied by a mild fever, arthralgia/ arthritis in the extremities, or non-pruritic conjunctivitis. Dermal pruritus may occur and myalgia, headache, retro-orbital pain, or gastrointestinal signs may also present. Rarely, neurological symptoms may occur	<ul style="list-style-type: none"> <li>• Infections can be mild or asymptomatic; co-infection is possible</li> <li>• Although each may have own characteristic symptoms, they <u>cannot</u> always be differentiated on signs/symptoms alone</li> <li>• CHIKV more likely to cause high fever (<math>\geq 39.0^{\circ}\text{C}</math> or <math>102.2^{\circ}\text{F}</math>), severe, focal polyarthralgia, maculopapular rash, and lymphopenia; DENV is more likely to cause diffuse body pain, neutropenia, thrombocytopenia, hemorrhage, shock, deaths; ZIKAV is more likely to cause itchy, maculopapular rash, arthralgia and conjunctivitis</li> <li>• Suspected chikungunya and Zika cases should be managed as dengue until dengue has been ruled out</li> </ul>
<b>Clinical lab findings</b>	Mild thrombocytopenia ( $>100,000/\text{mm}^3$ ), lymphopenia (decreased proportion of lymphocytes in the blood), elevated liver enzymes (ALT, AST)	Thrombocytopenia ( $<100,000/\text{mm}^3$ ), lymphopenia, neutropenia (decreased proportion of neutrophils in the blood) and elevated liver enzymes (ALT, AST); more severe signs with dengue hemorrhagic fever	Mild thrombocytopenia, lymphopenia and neutropenia may occur.	
<b>Reporting to Public Health</b>	All suspected/confirmed cases must be reported to local health department	Same	Same	Reports should be made within 3 days; see <a href="#">VDH Reportable disease list</a>
<b>Transmission</b>	By mosquito bite; may also be transmitted from infected mother to newborn baby during birth	By mosquito bite	By mosquito bite; may also be transmitted from infected mother to fetus during pregnancy and to newborn baby around time of birth; or from infected male to sex partner during sex (vaginal, anal, oral sex); reports of transmission through blood transfusion are being investigated	<ul style="list-style-type: none"> <li>• All transmitted by Asian tiger mosquito (<i>Aedes albopictus</i>) and Yellow Fever Mosquito (<i>Aedes aegypti</i>)</li> <li>• Local mosquitoes that become infected by feeding on infected travelers (including asymptomatic persons) can pass virus to local persons</li> <li>• Asian tiger mosquitoes feed primarily during daylight hours, but will enter homes and bite at day or night when indoors</li> </ul>
<b>Testing</b>				
<b>Specimen type</b>	Serum (preferred)	Serum (preferred)	<ul style="list-style-type: none"> <li>• Testing at state public health lab (DCLS) requires approval by local health department.</li> <li>• Serum (preferred) collected in serum separator tube and centrifuged before shipment to DCLS ; urine (paired with serum) can be tested by</li> </ul>	Serum is preferred specimen type for RT-PCR and serology

			RT-PCR at DCLS if collected within 25 days of onset or travel	
<b>Test type, sensitivity</b>	<ul style="list-style-type: none"> <li>• RT-PCR: most sensitive if collected within ≤8 days of onset</li> <li>• Serology: Development of IgM response may take 4 to 6 days after onset; specimens collected &lt;4 days after onset may be negative for IgM and a convalescent sample should be tested</li> </ul>	<ul style="list-style-type: none"> <li>• RT-PCR: most sensitive if collected within ≤5 days of onset;</li> <li>• Serology: Development of IgM response may take 5 to 6 days after onset; specimens collected &lt;5 days after onset may be negative for IgM</li> </ul>	<ul style="list-style-type: none"> <li>• RT-PCR: is the preferred assay if specimen collected within ≤7 days of onset;</li> <li>• Serology: Development of IgM may take 4 to 7 days after onset. Zika virus is strongly cross-reactive with other flaviviruses (e.g. dengue, WNV); specimens that test positive or equivocal for Zika virus IgM antibodies will require further testing at CDC by Plaque-Reduction Neutralization Test (PRNT)</li> </ul>	<ul style="list-style-type: none"> <li>• Recommend testing for CHIKV, DENV and, ZIKAV</li> <li>• Positive IgG in absence of positive IgM is consistent with past infection</li> <li>• Serology: acute and convalescent serum (collected 10-14 days after onset) are recommended</li> <li>• Dengue IgM negative cases (those that only test IgG positive for dengue on samples collected more than a week after illness onset) should be investigated as potential chikungunya cases</li> </ul>
<b>Labs and Testing Priority</b>	<ul style="list-style-type: none"> <li>• Focus Diagnostics (subsidiary of Quest Diagnostics) and DCLS offer both RT-PCR and serology; Mayo Medical Labs offers serology</li> <li>• If possible, use commercial lab for sporadic testing. Priorities for DCLS testing are: 1) those with compatible illness who traveled to endemic area; 2) those with compatible illness who did not travel (possible local spread); or 3) if commercial testing is not feasible</li> </ul>	<ul style="list-style-type: none"> <li>• Same commercial lab options. Labs can test for both DENV and for CHIKV</li> <li>• Same testing recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• RT-PCR for Zika, chikungunya and dengue viruses in serum or for Zika virus in urine is currently available at DCLS; <a href="#">Focus Diagnostics, Inc.'s</a> RT-PCR test for Zika virus in serum has been authorized for use</li> <li>• Immunological testing for dengue virus (IgM Capture ELISA) offered by commercial labs can be used to determine if an immune response to dengue or Zika is present. Dengue positive samples may be submitted to CDC for Zika testing by PRNT.</li> <li>• Refer to <a href="#">VDH testing algorithm</a> for testing pregnant women, infants, symptomatic travelers, symptomatic non-travelers, and those with GBS.</li> </ul>	<ul style="list-style-type: none"> <li>• Turnaround times vary by lab. At DCLS: RT-PCR turnaround time is ~ 1 business day after specimen receipt; serology turnaround time is ~5 business days after specimen receipt. At CDC, turnaround time for Zika, chikungunya and dengue virus testing is ~3-4 weeks; refer to individual commercial labs for faster turnaround times.</li> <li>• Specimens tested at DCLS/CDC should be coordinated through local health department. Refer to <a href="#">DCLS instructions</a> on collection, shipment and paperwork; complete the entire form, including date of onset, clinical details, detailed travel history</li> <li>• Ship specimens refrigerated (on frozen ice packs)</li> </ul>
<b>Prevention and Control</b>	Suspected cases (i.e., with symptoms but no test results) and asymptomatic travelers who traveled with those who have characteristic symptoms should avoid further mosquito exposure during 1 <sup>st</sup> week of illness (or return from travel)	Same	<ul style="list-style-type: none"> <li>• Check travel advisories; pregnant women should avoid travel to <a href="#">Zika areas</a></li> <li>• Avoid mosquito bites and eliminate container breeding areas near home;</li> <li>• Avoid sex or use barrier protection with sex partners who might have been exposed to Zika virus; if a pregnant woman's sex partner traveled to <a href="#">Zika areas</a>, then couple should use condoms or abstain from sex during pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>• For avoiding mosquito bites, VDH recommends staying indoors during day when Asian tiger mosquitoes feed outside or wearing protective clothing (e.g., long sleeves, pants, shoes and socks) and use repellent on exposed skin when outside, and maintain residence doors and windows screened to prevent mosquito entry into home;</li> </ul>
<b>More information</b>	<a href="#">CDC Chikungunya</a>	<a href="#">CDC Dengue</a>	<a href="#">VDH Information for Clinicians</a> <a href="#">CDC Zika Virus</a>	<a href="#">CDC Traveler's Health</a>