VDH Chikungunya, Dengue and Zika Virus Infections - Cheat Sheet for Healthcare Providers (October 24, 2017)

Characteristics	Chikungunya virus (CHIKV)	Dengue virus (DENV)	Zika virus (ZIKV)	Comments or additional information
Incubation Period	3-7 days (range 1-12 days)	4-10 days (range 3-14 days)	Range 3-14 days	
Signs and Symptoms	Fever, joint pain (usually bilateral, symmetric, and associated with distal joints such as the hands, feet, wrists, ankles, elbows and knees), headache, backache, muscle pain, maculopapular rash, arthritis, conjunctivitis, or nausea/vomiting; rarely, neurological symptoms, uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions or hemorrhage may occur	Several forms of dengue: undifferentiated fever, dengue fever (DF) without or with hemorrhage, and dengue hemorrhagic fever (DHF) without or with shock (dengue shock syndrome or DSS); DHF has three phases: febrile, critical and convalescent; symptoms range from fever, headache, retro-orbital pain, joint/muscle/bone pain, nausea, vomiting, swollen glands, rash, or mild bleeding (e.g., nose/gum bleeds, petechiae, easy bruising); severe symptoms include severe abdominal pain, persistent vomiting, tachypnea, hemorrhagic manifestations, fatigue, restlessness, or change in mental status; neurological symptoms rare	Maculopapular rash is the most common symptom, and it may be pruritic; other symptoms include a mild fever, arthralgia/arthritis in the extremities, or non-pruritic conjunctivitis, myalgia, headache, retro-orbital pain, or gastro-intestinal signs; rarely, neurological symptoms may occur, but has been linked to Guillain-Barre Syndrome, other neurological manifestations, and birth defects	• All 3 infections can be mild or asymptomatic (ZIKV > DENV > CHIKV); co-infection is possible • Although each infection may have characteristic symptoms, they cannot always be differentiated by signs/symptoms • Obtain travel history and pregnancy status information • CHIKV more likely to cause high fever (>39°C/102°F), severe, focal polyarthralgia, which can be debilitating, arthritis, maculopapular rash, and lymphopenia; DENV more likely to cause diffuse body pain, neutropenia, thrombocytopenia, hemorrhage, shock, and death; ZIKV more likely to cause itchy, maculopapular rash, arthralgia, and conjunctivitis • There are 4 DENV serotypes (I-IV), and infection with one type does not confer immunity to another serotype; sequential infections increase the risk for DHF and DSS • Suspected CHIKV and Zika cases should be managed as DENV (i.e., avoid NSAIDs) until DENV has been ruled out
Duration (if symptomatic)	Acute symptoms typically resolve in 7-10 days; possible relapse of rheumatologic symptoms for months to years	Febrile phase can last for 2-7 days; if there are severe manifestations, the critical phase will occur after the fever subsides, and can last 1-2 days; the convalescent phase can last 2-4 days	Several days-1 week	
Clinical Laboratory Findings	Mild thrombocytopenia, lymphopenia, elevated liver enzymes (ALT, AST), elevated creatinine	Thrombocytopenia, lymphopenia, neutropenia, elevated liver enzymes (ALT, AST); more severe signs and symptoms with DHF and DSS	Mild thrombocytopenia, lymphopenia and neutropenia may occur	
Reporting to Public Health	All suspected/confirmed cases must be reported to local health department (LHD)	Same as CHIKV	Same as CHIKV	Reports should be made within 3 days; see VDH Reportable Disease List or contact information for the local health department (LHD)
Transmission	Bite of infected mosquito; rarely transmitted from infected mother to newborn around the time of birth	Bite of infected mosquito	Bite of infected mosquito; from infected mother to fetus during pregnancy or around the time of birth; sexual transmission; blood transfusion and lab-associated transmission have been reported; transmission via healthcare exposure or organ transplant are possible	• All transmitted by Asian tiger mosquito (*Aedes albopictus*) and yellow fever mosquito *(Aedes aegypti*) • Mosquitoes in Virginia that become infected by feeding on infected travelers (including asymptomatic persons) can locally transmit virus to other individuals • Asian tiger and yellow fever mosquitoes feed primarily during daylight hours, but will enter homes and bite in day or at night when indoors
Testing				
Specimen Type	Serum (preferred)	Serum (preferred)	• Serum (collected in serum separator tube and centrifuged before shipment to DCLS) and urine (paired with serum) for RT-PCR at DCLS; serum for IgM and Plaque-Reduction Neutralization Test (PRNT) • Placental/fetal tissue	• Testing at state public health lab (Division of Consolidated Laboratory Services (DCLS)) requires pre-approval by local health department • CDC testing of placental/fetal tissue requires pre-approval by LHD and CDC

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Characteristics	Chikungunya virus (CHIKV)	Dengue virus (DENV)	Zika virus (ZIKV)	Comments or additional information
Test Type, Sensitivity	• RT-PCR: Most sensitive if collected ≤8 days of onset • Serology: Development of IgM response normally occurs toward end of first week of illness; specimens collected in the acute phase may be negative for IgM and a convalescent specimen should be tested	• RT-PCR: Most sensitive if collected ≤5 days of onset • Serology: Development of IgM response may take 5-6 days after onset; specimens collected <5 days after onset may be negative for IgM and a convalescent specimen should be tested	• RT-PCR: Performed if specimen collected within 14 days of onset; pregnant women may have prolonged viremia – see testing guidance • Serology: Development of IgM may take 4-7 days after onset; recommended if ≥14 days after onset; IgM response may persist beyond 12 weeks – see testing guidance for pregnant women. ZIKV IgM antibodies cross-react with those for other flaviviruses (e.g. DENV, WNV); specimens that test positive or equivocal require further testing by PRNT	• Recommend testing for all 3 viruses if patient is symptomatic • ZIKV testing generally not recommended for asymptomatic individuals, but there are specific circumstances when pregnant women should be tested - see testing guidance for pregnant women; ZIKV IgM testing is not recommended as part of preconception counseling • Positive IgG in absence of positive IgM is consistent with past infection • Acute and convalescent serum for serology (collected 10-14 days after onset) are recommended • DENV IgM negative cases (but test IgG positive for DENV on samples collected more than a week after illness onset) should be investigated as potential CHIKV cases • DENV IgG results for acute and convalescent specimens can help differentiate primary vs. secondary infection
Labs and Testing Priority	• **RT-PCR and serology:** ARUP, Focus Diagnostics, Mayo Medical Labs, DCLS and CDC; **Serology only:** LabCorp, and Solstas Lab Partners • If possible, use commercial lab for sporadic testing. DCLS testing priorities: 1) pregnant women with compatible illness who traveled to/lived in an endemic area; 2) those with compatible illness who did not travel (suspect local transmission); 3) commercial testing not feasible	• **RT-PCR, serology, and antigen (NS1):** Focus Diagnostics; **Serology and antigen (NS1):** Mayo Medical Labs, Solstas Lab Partners; **RT-PCR and serology:** DCLS and CDC; **Serology only:** ARUP, LabCorp, and ViraCor-IBT Laboratories • Second bullet same as CHIKV	• DCLS offers RT-PCR and IgM for ZIKV, CHIKV, DENV; refer to VDH testing algorithm for those eligible for public health testing if commercial lab testing is not feasible • Commercial labs offer nucleic acid tests and IgM for ZIKV, DENV, and CHIKV • CDC or other designated public health labs performs PRNT for confirmatory serology testing	• Turnaround times vary by lab; labs are instructed to complete all testing before reporting results • Zika testing: Specimens tested at DCLS/CDC should be coordinated through local health department, and a testing approval form should be completed. Refer to DCLS instructions on collection, shipment and paperwork; complete the entire form, including date of onset, detailed travel history, clinical details, pregnancy status, etc. • Ship specimens refrigerated (on frozen ice packs)
Prevention and Control	• 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 1st week of illness (or return from travel)	• Same as CHIKV	• Check CDC travel information for international and US territories travel, or for US states; pregnant women should avoid travel to areas with risk of Zika; partners of pregnant women and couples considering pregnancy should know the risks to pregnancy and take preventive steps • Avoid mosquito bites; eliminate container breeding areas near home • Avoid sex or use barrier protection with sex partners possibly exposed to ZIKV; pregnant couples at risk should use condoms or abstain from sex for entire pregnancy	• To avoid mosquito bites, VDH recommends staying indoors during the day when Asian tiger mosquitoes feed or wearing protective clothing (e.g., long sleeves, pants, shoes and socks) and use repellent (e.g., Picaridin or DEET based repellants) on exposed skin when outdoors, and maintain residence door and window screens to prevent mosquito entry into home; if returning from an area with Zika, CHIKV or DENV, dress protectively and use mosquito repellant when outside for 3 weeks after returning
More Information	CDC Chikungunya	CDC Dengue; WHO Dengue	VDH Clinician Information; CDC Zika Virus	CDC Traveler's Health