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Locally-Acquired and Travel-Related Arboviral Infections: Testing and Reporting Requirements for West Nile, Chikungunya, and Dengue Viruses

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Given the detection of mosquito pools infected with West Nile Virus (WNV) in Philadelphia and throughout Southeastern Pennsylvania, risk for human infection is increased. In addition to the official start of the 2014 WNV season, area healthcare providers should also be aware of recent increases in travel-related arboviral infections (chikungunya and dengue) among Philadelphia residents returning from subtropical and tropical regions. Since late May 2014, the Philadelphia Department of Public Health (PDPH) has identified 2 cases of chikungunya and continues to receive suspected case reports among residents returning from the Caribbean, specifically the Dominican Republic and Haiti, on an ongoing basis. Similarly, reported travel-related dengue infections increased in 2013 from an annual average of 1–2 cases to 11 cases among residents returning from the Dominican Republic, Puerto Rico, Brazil, Southern India, and Southeast Asia.

All suspected and confirmed cases of arboviral infection (neuroinvasive and non-neuroinvasive WNV, chikungunya, and dengue) as well as encephalitis cases should be reported immediately to PDPH Division of Disease Control (DDC) at 215-685-6740 during regular business hours or 215-686-4514 after-hours (ask to speak with the representative on-call for the division). **Your assistance with testing and immediate reporting of suspected arborviral infections enables us to determine potential exposure locations, direct additional mosquito-control efforts, and accurately monitor severe illness.**

SUMMARY POINTS

West Nile Virus (WNV) in Philadelphia

- Mosquito pools infected with WNV have been detected.
- Through October, collect both serum and cerebrospinal fluid (CSF) for WNV testing of patients who have unexplained encephalitis or meningitis.

Chikungunya and Dengue Virus Infections

- Recent increase in chikungunya and dengue among Philadelphia residents returning from subtropical and tropical regions
- If either is suspected, collect serum and test for both chikungunya and dengue.
  - Order PCR between day 1 and 8 of illness
  - Order IgM & IgG if ≥ day 4
- Patients with suspected chikungunya should be managed as dengue.
  - Use acetaminophen for initial fever and pain control.
- Advise patients with suspected chikungunya or dengue to stay indoors for the first 7 days of illness to prevent transmission

West Nile Virus (WNV)

Although less than 1% of infected individuals will develop WNV neuroinvasive disease (aseptic meningitis, encephalitis, or flaccid paralysis), severe illness may result in residual neurological deficits or death. The risk of neuroinvasive disease increases with age, and is highest among adults > 50 years old and among organ transplant patients. In recent years, WNV incidence in Philadelphia has oscillated with increases every other year. Incidence last peaked during the 2012 season when there were 9 human cases including 2 deaths.

Laboratory Diagnosis of WNV: Beginning now through the end of October, PDPH urges clinicians to collect both serum and cerebrospinal fluid (CSF) for WNV testing from patients who have onset of unexplained encephalitis or meningitis. WNV-specific IgM in serum or CSF is preferred for laboratory confirmation. Consider the specimen type and timing of collection when ordering WNV-specific IgM testing.

- Serum: Collect 8 to 14 days after illness onset. Draw and test additional serum if collected too early.
- CSF: Collect within 8 days of illness onset.

Many commercial laboratories offer serologic and polymerase chain reaction (PCR) testing for WNV. Any positive specimen should be forwarded to the Pennsylvania Department of Health Bureau of Laboratories (PADOH BOL) for confirmatory testing using standard methods developed by the Centers for Disease Control and Prevention (CDC). DDC can provide consultation for testing and help facilitate specimen submission to PADOH BOL. For WNV testing inquiries, contact Dana Perella, MPH, Vectorborne Disease Surveillance Coordinator at 215-685-6742.

Chikungunya and Dengue Virus Infections

With its recent emergence in the Americas in late 2013, chikungunya infection has quickly become another significant source of travel-related arboviral infection among Philadelphia residents along with dengue, the most common arboviral infection worldwide. PDPH encourages area healthcare providers to become familiar with the recognition, diagnosis, and treatment of both chikungunya and dengue infections.

Clinical Characteristics of Chikungunya and Dengue Infections:

	Average Incubation (Range)	% with Symptoms	Symptoms	Blood Abnormalities	Outcome
Chikungunya	3–7 days (1–12 days)	72%–97%	Fever and polyarthalgia with headache, myalgia, arthritis, conjunctivitis, nausea/vomiting, or maculopapular rash	Lymphopenia, thrombocytopenia, ↑ creatinine, ↑ LFTs	Resolves in 7–10 days; some have relapsing arthralgia; rarely fatal
Dengue	4–7 days (3–14 days)	25%	Fever with headache, retroorbital pain, myalgia, arthralgia, rash, or minor hemorrhagic manifestations 5% develop shock, respiratory distress, severe bleeding, or organ failure	Neutropenia, thrombocytopenia ↑ hematocrit	Fatal in up to 10% with severe infection

Laboratory Diagnosis: Given clinical and epidemiologic similarities, serum should be tested for both chikungunya and dengue if either is suspected. Appropriate test choice will depend on serum collection timing.

- Serum collected ≤ 3 days after symptom onset → Order chikungunya and dengue PCR
- Serum collected 4–8 days after symptom onset → Order chikungunya and dengue IgM, IgG, and PCR
- Serum collected > 8 days after symptom onset → Order chikungunya and dengue IgM and IgG

PCR and IgM/IgG antibody testing services for chikungunya and dengue are available directly through Focus Diagnostics. Quest Diagnostics and LabCorp also will accept orders and forward to Focus Diagnostics.

Treatment: Like WNV, there are no specific antiviral treatments for chikungunya and dengue other than supportive therapy. Given the consequences of severe dengue infection, patients with suspected chikungunya should be managed as dengue with acetaminophen recommended for initial fever and pain control. If initial treatment is inadequate and dengue has been ruled out, narcotics or NSAIDs may be considered to manage pain in patients with chikungunya. Detailed guidance from the World Health Organization on the inpatient management of severe dengue infection is available at: http://www.who.int/rpc/guidelines/9789241547871/en/.

Prevention of Local Transmission: Since the cycle of transmission for chikungunya and dengue can continue if an infected person is bitten by an *Aedes spp.* mosquito while viremic, it is important to advise suspected cases to stay indoors in air-conditioned or well screened accommodations for the first 7 days of illness. *Aedes albopictus* (Asian tiger mosquito), a vector for both chikungunya and dengue has been identified in Philadelphia from mosquito surveillance for WNV. Your guidance to suspected cases and prompt case reporting to PDPH will assist our efforts to prevent secondary transmission of both infections in Philadelphia.

Mosquito Bite Prevention: Between April and October, discuss the following prevention measures with your patients, especially those who work or are active outdoors. Regardless of season, personal prevention tips should also be shared with patients traveling to areas endemic for chikungunya, dengue, and other mosquito-borne infections.

- Use repellent with DEET (≥20% to also prevent tick bites), Picaridin, or oil of lemon eucalyptus when outdoors, especially during peak biting hours (dusk and dawn for WNV, daytime for chikungunya/dengue).
- When weather permits, wear long-sleeved shirts and long pants.
- Keep well-fitted screens on windows and doors along with using air conditioning.
- Regularly check and empty standing water outside their home (e.g., unused pools, tires, containers).
- Report mosquito problems and dead bird sightings to the PDPH Vector Control Program's Mosquito Complaint hotline at 215-685-9027.

Online Resources for Healthcare Providers

- Current Updates on West Nile Virus and Other Arbovirus Activity in Philadelphia: https://hip.phila.gov/xv
- *Chikungunya Virus – An Emerging Threat to the Americas (Free CME):* http://emergency.cdc.gov/coca/calls/2014/callinfo_021814.asp
- *CDC Dengue Clinical Case Management Course (Free CME):* http://www.cdc.gov/dengue/training/cme.html

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