NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

ROY COOPER • Governor
MANDY COHEN, MD, MPH • Secretary
MARK T. BENTON • Assistant Secretary for Public Health
Division of Public Health

Date: 13 May 2021
To: North Carolina Clinicians
From: Alexis M. Barbarin, MEd, PhD, Public Health Entomologist
Through: Jean-Marie Maillard, MD, MSc, Medical Director
Subject: Annual Update on Diagnosis and Surveillance for Vector-borne diseases

Introduction

Vector-borne diseases in North Carolina are caused by a wide range of mosquito- and tickborne bacteria, viruses, and parasites that are both endemic and travel-associated. Vector-borne illnesses continue to cause significant morbidity in North Carolina, with more than 1000 confirmed, probable and suspected cases in 2020. This update is intended to encourage patient education about the prevention of mosquito- and tickborne illness, as well as to provide a reminder about diagnosis, treatment, and reporting.

Surveillance for Vector-borne Illnesses

Per North Carolina law (10A NCAC 41A .0101), clinicians are required to report confirmed or suspected cases of anaplasmosis, babesiosis, dengue virus, Eastern equine encephalitis (EEE), ehrlichiosis, La Crosse encephalitis (LACE), Lyme disease, malaria, spotted fever group rickettsiosis, and West Nile virus (WNV) and Zika virus infections to their local health department. Laboratory diagnostic tests demonstrating isolation or identification of the pathogens are also reportable by laboratories to the Division of Public Health. North Carolina adheres to CDC case definitions for each of the vector-borne infections, which establish uniform criteria for disease reporting to accurately monitor trends, take action to reduce disease, and protect public health.

Actions for North Carolina Clinicians

- Report cases of vector-borne infections to your local health department within 7 days of a positive laboratory test, or within 24 hours for Zika virus infection.
- Remind patients to take preventive measures including: recognizing and avoiding tick habitats; using CDC-recommended and EPA-registered insect repellents when outdoors; showering immediately after returning indoors; removing attached ticks promptly; using permethrin treated clothing; creating tick-safe zones in their yard; and tipping and tossing any standing water in their yards that would promote mosquito development.
- Consider vector-borne infections in persons with a clinically compatible illness and/or appropriate travel history.
- Familiarize yourself with the laboratory assays available to diagnose mosquito- and tickborne illness.
    - **Serologic testing for Spotted Fever Group Rickettsia and Ehrlichia**
        - In January 2020, the CDC surveillance case definition of spotted fever group rickettsioses was changed to increase the acute titer needed to classify a case as probable from 1:64 to ≥1:128. You can view the current CDC case definition here. Clinical criteria remain the same.
    - Case definitions for Ehrlichia infections are located here.
    - **Two tier testing for Lyme disease**

        - A two-tier approach for *Borrelia burgdorferi* infection using a sensitive ELISA (EIA) followed by an IgG and IgM Western Blot is recommended. All specimens positive or equivocal by EIA should be reflexed for a Western Blot. Specimens negative by EIA need not be tested further.
    - Serologic testing for arboviral diseases
        - Testing is offered at no charge from the State Laboratory of Public Health (http://slph.ncpublichealth.com/virology-serology/arbovirus.asp). Early diagnosis of LACE is critical to adapting therapy and eliminating unnecessary treatment and important for surveillance of the disease. The sensitivity and rapidity of diagnosis of the MAC ELISA test provide a powerful tool for the serodiagnosis of LACE infections in humans.
        - For WNV, if serum is collected within 8 days of illness onset, the absence of detectable virus-specific IgM does not rule out the diagnosis of WNV infection, and the test may need to be repeated on a later sample (https://www.cdc.gov/westnile/healthcareproviders/healthCareProviders-Diagnostic.html)

Treatment for Vector-borne Illnesses

Regardless of the infectious agent, if any of the tickborne illnesses are suspected (e.g., anaplasmosis, ehrlichiosis, Lyme disease, and spotted fever group rickettsioses), patients of all ages, including children, should be treated promptly and appropriately with doxycycline. Since laboratory confirmation of infection may take days to weeks, therapy should not be delayed pending diagnosis.

While local transmission of babesiosis in North Carolina is unclear, travel to areas of the US where babesia is endemic increases a patient's risk of contracting the disease. Most patients who are asymptomatic for babesiosis do not require treatment. Treatment decisions should be personalized, especially for patients who are at risk for severe or relapsing infection. For ill patients, babesiosis is usually treated for at least 7-10 days with a combination of two prescription medications. (See CDC recommendations.)

Treatment of arboviral diseases is supportive. Existing anti-viral drugs are not effective against these diseases. Severe illnesses are treated by supportive therapy which may require hospitalization and include respiratory support, IV fluids, and prevention of other infections.

Treatment of malaria is largely dependent on the *Plasmodium* species infecting the patient. Once the diagnosis of malaria has been made, appropriate antimalarial treatment must be initiated immediately. The CDC provides guidelines and information that can be used for treatment of malaria in the United States.

Additional Information

- CDC practical guide for health care professionals (spotted fever group rickettsiosis): https://www.cdc.gov/mmwr/volumes/65/rr/rr6502a1.htm
- CDC Lyme disease treatment guidelines: https://www.cdc.gov/lyme/treatment/index.html
- CDC guidelines and publications for arboviral diseases: https://www.cdc.gov/ncezid/dvbd/vbdelc/guidelines-publications/index.html

CC: Zack Moore, MD, MPH, State Epidemiologist
Evelyn Foust, MPH, CPM, Communicable Disease Branch Head