

## EHRlichiosis INVESTIGATION OVERVIEW

Ehrlichiosis is the general name used to describe diseases caused by the bacteria *Ehrlichia chaffeensis*, *E. ewingii*, or *E. muris eauclairensis* in the United States. These bacteria are spread to people primarily through the bite of infected ticks including the lone star tick (*Amblyomma americanum*) and the blacklegged tick (*Ixodes scapularis*). Ehrlichiosis typically presents 5 to 14 days after a tick bite with a combination of nonspecific clinical symptoms, such as fever, fatigue, and headache. Illness is often accompanied by laboratory abnormalities including leukopenia, thrombocytopenia, and mildly elevated liver enzymes.

[CDC webpage for Ehrlichiosis](#)

For additional support, consult the NC Communicable Disease Branch at (919) 733-3419.

## BASIC STEPS OF AN EHRlichiosis INVESTIGATION

<p>1. Review Lab Information</p>	<ul style="list-style-type: none"> <li>• If lab is required for disease make sure lab criteria meets the case definition, if not met, do NOT create an NCEDSS event             <ul style="list-style-type: none"> <li>• Serological evidence of elevated IgG antibody reactive with <i>Ehrlichia</i> spp. antigen by IFA at a titer <math>\geq 1:128</math> in a sample taken within 60 days of illness onset <b>OR</b></li> <li>• Microscopic identification of intracytoplasmic morulae in leukocytes in a sample taken within 60 days of illness onset <b>OR</b></li> <li>• Detection of <i>E. chaffeensis</i>, <i>E. ewingii</i>, <i>E. muris eauclairensis</i>, unspciated <i>Ehrlichia</i> spp., or other <i>Ehrlichia</i> spp. DNA in a clinical specimen via amplification of a specific target by polymerase chain reaction (PCR) assay, nucleic acid amplification tests (NAAT), or other molecular method, <b>OR</b></li> <li>• Serological evidence of a fourfold change<sup>1</sup> in immunoglobulin G (IgG)-specific antibody titer to <i>Ehrlichia</i> antigen by indirect immunofluorescence assay (IFA) in paired serum samples (one taken in first two weeks after illness onset and a second taken two to ten weeks after acute specimen collection) <b>OR</b></li> <li>• Demonstration of ehrlichial antigen in a biopsy or autopsy sample by immunohistochemical methods <b>OR</b></li> <li>• Isolation of <i>E. chaffeensis</i>, <i>E. ewingii</i>, <i>E. muris eauclairensis</i>, unspciated <i>Ehrlichia</i> spp., or other <i>Ehrlichia</i> spp. from a clinical specimen in cell culture with molecular confirmation (e.g., PCR or sequence).</li> </ul> </li> <li>• Clinical criteria are required for the Ehrlichiosis case definition. Laboratory evidence alone is not sufficient to meet case definition.</li> </ul>
<p>2. Verify County of Residence</p>	<ul style="list-style-type: none"> <li>• If out of state, update the person tab with correct address and return event to State.</li> <li>• If resident of another county, reassign event to that county on administrative tab.</li> </ul>
<p>3. Collect clinical information</p>	<p>Obtain clinical information from medical records.</p> <p><u>Objective clinical evidence:</u> measured fever as reported by patient or healthcare provider, anemia, leukopenia, thrombocytopenia, any hepatic transaminase elevation</p> <p><u>Subjective clinical evidence:</u> chills/sweats, headache, myalgia, nausea/vomiting, or fatigue/malaise</p> <p><b>*As of 2024, fever is not always a <u>required</u> clinical criteria element*</b></p>
<p>4. Identify Source of Exposure</p>	<ul style="list-style-type: none"> <li>• A risk history is important to track the advancement of tickborne disease into NC.</li> <li>• Obtain the risk history of tick bites, and outdoor activity.</li> <li>• Pets can bring infected ticks into the home or yard.</li> <li>• A reported tick bite is not necessary to meet case defining because ticks may be extremely small, and a person may not have been aware of the tick bite</li> </ul>
<p>5. Special Considerations</p>	<ul style="list-style-type: none"> <li>• In high profile cases (i.e. death of a child, multiple cases in one geographic area, etc.), consider verifying the laboratory test results by sending specimen(s) to</li> </ul>

SLPH/CDC for confirmatory testing.

- Consider testing by SLPH/CDC for isolated cases with a high degree of suspicion for disease when commercial test results do not satisfy the CDC case definition if within time frames for obtaining serum samples or original serum samples can be recovered.
- In cases of death, ensure specimens are not discarded and are available for testing.
- Patients should not be classified as cases for both anaplasmosis and ehrlichiosis based on serologic evidence alone.

## CRITICAL ELEMENTS FOR NCEDSS

### ➤ Clinical Package

- Use case definition to determine if clinical and laboratory findings meet the case definition.
- REMINDER, beginning in 2024, fever is not always a required part of the criteria. Until the NCEDSS disease package is updated, please enter **Chills/sweats, fatigue/malaise, nausea/vomiting** in the free text box under ‘Other symptoms, signs, clinical findings, or complications consistent with this illness’
- *Date that best reflects the earliest date of illness identification* should be the date symptoms began.
  - If it is impossible determine the symptom onset date, the next best option is to use the date of laboratory testing (collection date).

### ➤ Risk History Package

- Risk history is important to track the advancement of tickborne disease into NC.
- Obtain risk history of possible tick bite, outdoor activity.
- Since ticks may be extremely small, and a person may not have been aware of the tick bite, lack of known tick bite does not eliminate the case.