Lyme disease

Important Notice:
*All public health recommendations for routine investigations are based on "Control of Communicable Diseases Manual, 20th edition, 2015" (CCDM) unless otherwise stated. Use the CCDM as primary resource for case investigations that meet routine follow up. In cases of complicated situations or unique issues not addressed by this manual, please refer to the Administrative Rules of Montana (ARM) Chapter **37.114** or contact the designated SME at Communicable Disease Epidemiology section at the Montana DPHHS for further clarification.*

PROTOCOL CHECKLIST

- ☐ Confirm diagnosis, see case definition (see sections 3 and 4.1)
- ☐ Review background information on the disease and its epidemiology (see section 2)
- ☐ Prioritize reported cases for follow up, investigate and interview as appropriate (see section 1.2)
- ☐ Contact healthcare provider to gather more information (see section 4.3)
- ☐ Notify state health department of case by entering available information into the Montana Infectious Disease Information System (MIDIS) within 7 days per (ARM) **37.114.204** (see section 1.3)
- ☐ Retrieve Lyme disease form per the Montana Communicable Disease Reporting Reference for Local Public Health Jurisdictions or clinician (see SharePoint → CDEpi → CDEpi Disease Forms)
- ☐ Interview patient, cover the following:
  - ☐ Review disease facts with patient (see section 2.2)
  - ☐ Educate patient on prevention (see section 6)
  - ☐ Ask about exposures to relevant risk factors (see section 4.3)
  - ☐ Identify potentially exposed persons (see section 4.4)
  - ☐ Address patient's questions or concerns
- ☐ Follow-up on special situations, including outbreaks (see section 5 and CCDM, review references and additional information or contact CDEpi at 406-444-0273)
- ☐ Enter additional data obtained from interview into MIDIS (fax completed form to CDEpi at 1-800-616-7460 if indicated on the CD Reporting Reference form)
- ☐ Attach any additional laboratory reports to case investigation (a step in MIDIS)
- ☐ When done with investigation, close case in MIDIS

1 DISEASE REPORTING

1.1 Provider notification to Public Health Authorities

Any person, including, but not limited to a physician, dentist, nurse, medical examiner, other health care practitioner, administrator of a health care facility or laboratory, public or private school administrator, or laboratory professional who knows or has reason to believe that a case exists of a reportable disease or condition defined in the Administrative Rules of Montana (ARM) **37.114.203** must immediately report to the local health officer.

1.2 Local Health Department Follow-up Responsibilities

Immediately after being notified of a case or a potential outbreak of a reportable condition, a local health officer must investigate and implement control measures as indicated by CCDM to prevent or control the transmission of disease per (ARM) **37.114.314**.

1.3 Local Health Department Reporting to State Public Health Authorities

Lyme disease cases must be reported to DPHHS within 7 days. The disease specific form does not need to be submitted to DPHHS as part of the disease investigation process. Local health officers are required to report information about a case to DPHHS within the timeframes established in (ARM) **37.114.204**.

2 THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Public Health Significance in Montana:

CDEpi received reports of 49 cases of Lyme disease during 2003 to 2012. Each of these cases occurred among persons with a history of travel to areas known to be endemic for Lyme disease. Tick species known be competent vectors for *Borrelia burgdorferi*, the etiologic agent for Lyme disease, are not known to exist in Montana.

2.2 Clinical Description of Illness

Refer to CCDM for relevant disease information and its epidemiology. Additional information may also be found in Section 3, or CDC Lyme disease website.

3 CASE DEFINITION

3.1 Clinical Description

A systemic, tick-borne disease with protean manifestations, including dermatologic, rheumatologic, neurologic, and cardiac abnormalities. The most common clinical marker for the disease is erythema migrans (EM), the initial skin lesion that occurs in 60 to 80% of patients.

For purposes of surveillance, EM is defined as a skin lesion that typically begins as a red macule or papule and expands over a period of days to weeks to form a large round lesion, often with partial central clearing. A single primary lesion must reach greater than or equal to 5 cm in size across its largest diameter. Secondary lesions also may occur. Annular erythematous lesions

occurring within several hours of a tick bite represent hypersensitivity reactions and do not qualify as EM. For most patients, the expanding EM lesion is accompanied by other acute symptoms, particularly fatigue, fever, headache, mildly stiff neck, arthralgia, or myalgia. These symptoms are typically intermittent. The diagnosis of EM must be made by a physician. Laboratory confirmation is recommended for persons with no known exposure.

For purposes of surveillance, late manifestations include any of the following when an alternate explanation is not found:

- *Musculoskeletal system*. Recurrent, brief attacks (weeks or months) of objective joint swelling in one or a few joints, sometimes followed by chronic arthritis in one or a few joints. Manifestations not considered as criteria for diagnosis include chronic progressive arthritis not preceded by brief attacks and chronic symmetrical polyarthritis. Additionally, arthralgia, myalgia, or fibromyalgia syndromes alone are not criteria for musculoskeletal involvement.
- *Nervous system*. Any of the following, alone or in combination: lymphocytic meningitis; cranial neuritis, particularly facial palsy (might be bilateral); radiculoneuropathy; or, rarely, encephalomyelitis. Encephalomyelitis must be confirmed by demonstration of antibody production against *B. burgdorferi* in the cerebrospinal fluid (CSF), evidenced by a higher titer of antibody in CSF than in serum. Headache, fatigue, paresthesia, or mildly stiff neck alone, are not criteria for neurologic involvement.
- Cardiovascular system. Acute onset of high-grade (2nd-degree or 3rd-degree) atrioventricular conduction defects that resolve in days to weeks and are sometimes associated with myocarditis. Palpitations, bradycardia, bundle branch block, or myocarditis alone are not criteria for cardiovascular involvement.

3.2 Laboratory Criteria for Diagnosis

For the purposes of surveillance, the definition of a qualified laboratory assay is

- Positive culture for *B. burgdorferi*, OR
- Two-tier testing interpreted using established criteria, where:
    - Positive IgM is sufficient only when ≤30 days from symptom onset
    - IgG is sufficient at any point during illness
- Single-tier IgG immunoblot seropositivity using established criteria.
- CSF antibody positive for *B. burgdorferi* by Enzyme Immunoassay (EIA) or Immunofluorescence Assay (IFA), when the titer is higher than it was in serum

3.3 Case Classification (2011 CSTE Case Definition)

Suspected

- A case of EM where there is no known exposure (as defined above) and no laboratory evidence of infection (as defined above), OR
- A case with laboratory evidence of infection but no clinical information available (e.g., a laboratory report).

Probable

Any other case of physician-diagnosed Lyme disease that has laboratory evidence of infection (as defined above).

Confirmed

- A case of EM with a known exposure (as defined below), OR
- A case of EM with laboratory evidence of infection (as defined above) and without a known exposure OR
- A case with at least one late manifestation that has laboratory evidence of infection.

Exposure

Exposure is defined as having been (less than or equal to 30 days before onset of EM) in wooded, brushy, or grassy areas (i.e., potential tick habitats) in a county in which Lyme disease is endemic. A history of tick bite is not required.

Endemicity

A county in which Lyme disease is endemic is one in which at least two confirmed cases have been acquired in the county or in which established populations of a known tick vector are infected with *B. burgdorferi*.

Comment(s)

Lyme disease reports will not be considered cases if the medical provider specifically states this is not a case of Lyme disease, or the only symptom listed is "tick bite" or "insect bite".

4 ROUTINE CASE INVESTIGATION

In accordance with (ARM) **37.114.314** make an epidemiologic investigation to determine the source and possible transmission of *B. burgdorferi*. Refer to the CCDM regarding additional aspects related to investigation.

4.1 Confirm the Diagnosis

Review the clinical presentation and laboratory results to confirm the diagnosis. Consult with the CCDM and CSTE case definition in Section 3 to determine if this is a case of Lyme disease.

4.2 Laboratory Requirements

For more information on analysis and specimen collection please contact the laboratory conducting the test or the Montana Public Health Laboratory (MTPHL) at 1-800-821-7284. The MTPHL Laboratory Services Manual can be accessed here: http://dphhs.mt.gov/publichealth/LaboratoryServices/PublicHealthLabTesting

CDEpi may request a confirmatory specimen for epidemiologic purposes, but a confirmatory specimen is not required to be sent to the Montana Public Health Laboratory.

Some laboratories offer Lyme disease testing using assays whose accuracy and clinical usefulness have not been adequately established. Unvalidated tests available as of 2011 include:

- Capture assays for antigens in urine
- Culture, immunofluorescence staining, or cell sorting of cell wall-deficient or cystic forms of *B. burgdorferi*
- Lymphocyte transformation tests
- Quantitative CD57 lymphocyte assays
- "Reverse Western blots"
- In-house criteria for interpretation of immunoblots
- Measurements of antibodies in joint fluid (synovial fluid)
- IgM or IgG tests without a previous ELISA/EIA/IFA

4.3 Case Investigation

a. Contact the healthcare provider who ordered testing or is attending the case. Using the case report form, itemize signs and symptoms. Get copies of laboratory reports that support the diagnosis and medical report from the healthcare provider. It is important to consult the medical records or the healthcare provider in evaluating Lyme disease cases, as many of the clinical findings required in the case definition must be objectively verified by a provider, not subjectively reported by the patient. It is also important to establish whether the provider diagnosed Lyme disease, or specifically stated that the illness is not Lyme disease, which would mean the patient will not be considered a case. Use the case reporting form to assist in obtaining all of the information necessary to complete a Lyme disease case report as outlined in (ARM) **37.114.205** regarding report contents.

b. Contact and interview the patient to determine source, risk factors, and transmission settings. For cases exposed outside of highly endemic areas (especially those exposed in Montana or other Rocky Mountain states), call CDEpi at 406-444-0273 to arrange for confirmatory laboratory testing offered through MTPHL.

c. Identify potential sources of infection (i.e., assess the possibility of tick exposure). Ask about tick bites, and known or possible duration of tick attachment. If the exposure occurred in Montana or other Rocky Mountain states, get a detailed description of the geographic location where exposure might have occurred. If there is no known tick bite, collect information about exposure to hard tick habitats (woods, tall grasses, etc). Document the likely exposure location in the case report form. For example, "patient was hiking on XYZ trail at Mt. X National Park".

4.4 Identify Potentially Exposed Persons

Identify other persons potentially exposed to Lyme disease and educate them about the symptoms of Lyme disease to facilitate early diagnosis. Other symptomatic members of the individual's group or family that may have had similar tick exposures may also benefit from testing and education.

4.5 Environmental Evaluation

None. However, in the unlikely event of a confirmed case without a recent travel history, CDEpi might want to collaborate with subject matter experts at CDC or other agencies to perform tick dragging in the area of likely exposure to document the presence of tick species capable of transmitting *B. burgdorferi*.

5 CONTROL MEASURES

In accordance with (ARM) **37.114.501** use the control measures indicated in the CCDM for Lyme disease. Contact CDEpi for consultation and questions at 406-444-0273.

5.1 Case Management

Hospitalized patients should be cared for using standard precautions. There is no need for patient isolation or work/childcare restrictions. Educate patients and others about avoiding exposure to ticks in the future.

5.2 Contact Management

Educate other persons potentially exposed to Lyme disease about the symptoms of the disease to facilitate early diagnosis. Prophylactic antibiotics are typically **not** recommended for asymptomatic persons with a history of a tick bite.

5.3 Environmental Measures

Typically none.

5.4 Special Circumstances

None.

6 ROUTINE PREVENTION

6.1 Immunization Recommendations: A Lyme disease vaccine is not currently available.

6.2 Prevention Recommendations

Even though tick species capable of transmitting *B. burgdorferi* are not known to exist in Montana, these precautions should be followed to prevent the transmission of other tick-borne diseases.

- Wear long pants and a long-sleeved shirt. Tuck your pant legs into socks or boots and shirt into pants. This can help keep ticks on the outside of your clothing where they can be more easily spotted and removed.
- Wear light colored, tightly woven clothing that will allow the dark tick to be seen more easily. The tight weave makes it harder for the tick to attach itself.
- Use tick repellent when necessary, and carefully follow instructions on the label. Products containing DEET or permethrin are effective in repelling ticks. Take special care when using repellents on children.

- Check yourself, your children, and pets thoroughly for ticks. Carefully inspect areas around the head, neck, and ears. If you find a tick attached to your skin, promptly remove it. Grasp the tick using tweezers as close to the skin as possible. With a steady motion, pull the tick straight out. Wash your hands and apply antiseptic to the bite. Do not crush ticks in situ; this could result in direct inoculation of spirochetes. For more information about removing a tick, visit: http://www.cdc.gov/ticks/removing_a_tick.html.
- Monitor the bite and be alert for early symptoms of tick-borne disease particularly "flu-like" symptoms or rash over the next month or so. If you develop symptoms, contact a healthcare provider.

7 ESCALATION/ACTIVATION OF EMERGENCY OPERATIONAL PLANNING

Investigation guidelines are designed to assist local health jurisdictions in the steps and actions needed to report, investigate and control reported cases of communicable diseases. In the event individual case investigations or other reported cases lead to clusters and/or outbreaks, or investigations outside of a local health jurisdiction, local health jurisdictions need to contact DPHHS under the Administrative Rules of Montana 37.114.314 and 37.114.315 so DPHHS can consider emergency operational escalation or activation under the Communicable Disease Annex to the DPHHS Emergency Operation Plan.

8 REFERENCES AND ADDITIONAL INFORMATION

Important references:

A. American Public Health Association. Control of Communicable Diseases Manual (CCDM), 20th edition, 2015. https://secure.apha.org/imis/ItemDetail?iProductCode=978-087553-0185&CATEGORY=BK
B. Centers for Disease Control and Prevention (CDC). Lyme disease. http://www.cdc.gov/lyme/
C. CDC. Tickborne diseases of the United States — a reference manual for healthcare providers. http://www.cdc.gov/lyme/resources/TickborneDiseases.pdf
D. CDC. Concerns regarding a new culture method for *Borrelia burgdorferi* not approved fror the diagnosis of Lyme disease. MMWR. 2014;63(15):333. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6315a4.htm