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RESOURCES

1. Regions Where Ticks Live:
cdc.gov/ticks/geographic_distribution.html
2. ARUP test directory: ltd.aruplab.com
3. ARUP Consult
 - **Tickborne Diseases**—arupconsult.com/content/tickborne-diseases
 - **Lyme Disease Testing Algorithm**—arupconsult.com/algorithm/lyme-disease-testing-algorithm



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Tickborne Infections

testing at ARUP Laboratories



Babesia parasites inside red blood cell, the causative agent of babesiosis



Tickborne diseases are becoming a more frequent health problem as people build homes or travel in formerly uninhabited wilderness areas where ticks and their animal hosts live. Ticks can be infected with bacteria, viruses, or parasites.



TICKBORNE DISEASES IN THE UNITED STATES

- Lyme disease, ehrlichiosis, and anaplasmosis
- Rocky Mountain spotted fever (RMSF)
- Babesiosis
- Colorado tick fever (CTF)
- Tularemia
- Relapsing fever (Borrelia)
- Southern tick-associated rash illness (STARI)
- Deer tick virus (Powassan)
- Heartland virus
- Bourbon virus
- Tick paralysis

TICK SEASON

Tick season runs from April to September, with peak months being May through August.

DISEASE TRANSMITTAL

Tick species vary by geographical area; however, for various reasons these regions are expanding. Only the bites of certain tick species can transmit disease to humans.

Test Code	Test Name	Recommended Use and Advantages
Molecular detection		
2008670	Tick-Borne Disease Panel by PCR, Blood	Preferred panel for diagnosing possible tickborne disease (i.e., Anaplasmosis, Ehrlichiosis, or Babesiosis) during the acute phase of the disease.
2007862	<i>Ehrlichia</i> and <i>Anaplasma</i> Species by PCR	Detects and speciates: <i>Anaplasma phagocytophilum</i> , <i>Ehrlichia chaffeensis</i> , <i>E. ewingii</i> / <i>E. canis</i> , <i>E. muris</i> -like. Rare <i>E. ewingii</i> and <i>E. canis</i> infections cannot be differentiated by this test.
2008665	<i>Babesia</i> Species by PCR	This PCR test detects nucleic acid from <i>B. microti</i> and detects but does not differentiate between <i>B. duncani</i> , <i>B. divergens</i> , strain MO-1, and strain EU-1.
0055570	<i>Borrelia</i> Species by PCR (Lyme Disease)	May be useful if strong suspicion of Lyme disease persists in spite of persistent negative serologic testing.
3000010	Relapsing Fever <i>Borrelia</i> Species by PCR	Diagnose relapsing fever caused by various <i>Borrelia</i> species during the symptomatic phase of infection.
Antibody		
0097303	<i>Anaplasma phagocytophilum</i> (HGA) Antibodies, IgG and IgM	Acceptable test for acute or convalescent phase of infection from <i>A. phagocytophilum</i> . Individual IgG and IgM antibodies for <i>Anaplasma phagocytophilum</i> are available.
0093048	<i>Babesia microti</i> Antibodies, IgG and IgM by IFA	Useful if Giemsa stain is negative but high suspicion of babesiosis exists. Will not detect <i>B. duncani</i> or strain MO-1.
3006053	<i>Borrelia burgdorferi</i> VlsE1/pepC10 Antibodies, Total by ELISA With Reflex to IgM and IgG by ELISA (Modified Two-Tier Testing)	Preferred reflex test to diagnose Lyme disease in symptomatic individuals. Reflex pattern follows the modified two-tier testing (MTTT) approach; a positive or equivocal screen is confirmed by immunoassay.
0050254	<i>Borrelia burgdorferi</i> Antibodies, IgG and IgM by Immunoblot	Do not order in the absence of a positive/equivocal ELISA screening test. IgM Immunoblot is not useful after the first 4 weeks of clinical symptoms. Individual antibodies IgG and IgM for <i>Borrelia burgdorferi</i> by Immunoblot are available.
0051002	<i>Ehrlichia chaffeensis</i> Antibody, IgG and IgM by IFA	Diagnose infection from <i>Ehrlichia chaffeensis</i> . Individual IgG and IgM antibodies for <i>E. chaffeensis</i> are available.
3002912	<i>Francisella tularensis</i> Antibodies, IgG and IgM with Reflex to Agglutination	Cross-reactivity with <i>Brucella</i> and <i>Yersinia</i> antibodies may occur. Therefore, results should be interpreted with caution and correlated with clinical information. The best evidence for current infection is a significant change on two appropriately timed specimens, where both tests are performed in the same laboratory at the same time. Individual IgG and IgM antibodies for <i>Francisella tularensis</i> are available.
0050371	<i>Rickettsia rickettsii</i> (Rocky Mountain Spotted Fever) Antibodies, IgG and IgM by IFA	The best evidence for current infection is a significant change on two appropriately timed specimens, where both tests are done in the same laboratory at the same time. The CDC does not use IgM results for routine diagnostic testing of Rocky Mountain spotted fever as the response may not be specific for the agent (resulting in false positives), and the IgM response may be persistent from past infection. Individual IgG and IgM antibodies for <i>Rickettsia rickettsii</i> are available.



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