Quest Diagnostics™

# Accurately diagnose your patients with **tick-borne diseases** sooner

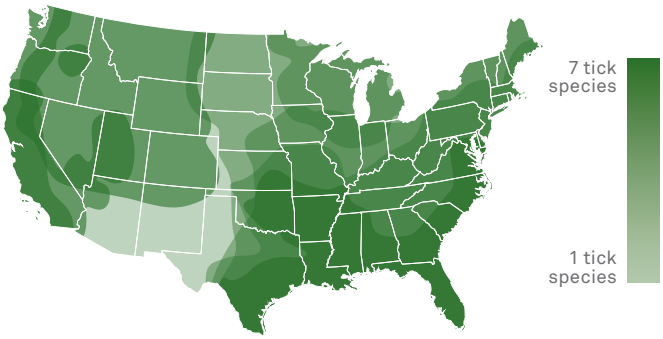
Get the insights you need with a comprehensive menu of reliable tick-borne disease testing from Quest Diagnostics

# Diagnose and manage tick-borne diseases earlier

## Ticks and the diseases they carry have spread significantly in the last 2 decades[1]

Tick-borne diseases have become a growing problem in the U.S., increasing in prevalence and expanding in geographic range.[1] While Lyme disease is the most common tick-borne illness, there are many types—based on location and causative agent—including both rickettsial diseases, such as anaplasmosis, ehrlichiosis, and Rocky Mountain spotted fever, and non-rickettsial diseases, such as babesiosis and tularemia.

Many of these illnesses can have similar signs and symptoms, including skin rash, fever, and chills—presenting a diagnostic challenge. Adding to that challenge is co-infection with multiple tick-borne diseases, which may be common.[2] A recent study of more than 3,000 patients with chronic Lyme disease found that over 50% had co-infections, with 30% reporting 2 or more co-infections.[3]




**Geographic areas of prevalent tick species in the U.S.[4]**

### Testing from Quest can help you make accurate tick-borne disease diagnoses

With more than 30 tick-borne disease tests and panels, including both molecular and serologic testing, Quest can help you make timely, differential diagnoses.

An estimated

**300,000**

people in the U.S. are diagnosed with Lyme disease each year[5]

### Testing helps support accurate, differential diagnoses

Diagnosis of tick-borne disease is primarily based on:

- History of exposure to an area where ticks are endemic
- Clinical presentation

Because tick-related illnesses present similar signs and symptoms, laboratory testing can help confirm clinical diagnosis. Tests include:

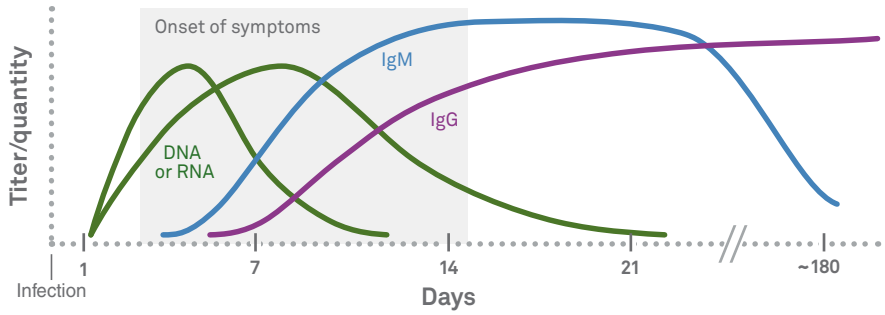
- Polymerase chain reaction (PCR)-based assays
- Serologic techniques
- Microscopic visualization
- Culture
- Tick identification

## Know specifically which tick-borne diseases your patient may have

### CDC guidelines: test to confirm

**CDC guidelines for diagnosis of tick-borne diseases recommend lab testing to confirm diagnosis, as treatment may vary by disease type.**[6] Although serologic testing has generally served as the gold standard for tick-borne disease diagnosis, molecular testing can be useful for detecting and differentiating among diseases, particularly in acute cases or within the first week or 2 of illness.[6]

**A general pattern for molecular vs. serologic testing**[7]




**For Lyme disease, the CDC currently recommends a 2-step algorithm for serologic testing:**[8]

**Step 1**
Enzyme immunoassay (EIA) or immunofluorescence assay (IFA)—if negative, no further testing is recommended; if positive or indeterminate, the second step should be performed

**Step 2**
Immunoblot test—results are considered positive only if the EIA/IFA and immunoblot are both positive

### Quest offers a comprehensive tick-borne disease test portfolio

Quest's portfolio of accurate, reliable tick-related tests and panels adheres to CDC guidelines, providing you with the insight you need to:

Make a timely, differential diagnosis | Distinguish acute from chronic disease | Identify ticks and other arthropods

## Quest offers more than 30 tests and panels for the accurate diagnosis and management of tick-borne diseases.

# Rely on location, causative agent, and testing to make accurate tick-borne disease diagnoses

Tear off to use as a quick disease overview guide.

Quest Diagnostics™

### Lyme disease

**Ticks:** blacklegged or deer tick *(Ixodes scapularis)*, western blacklegged tick *(Ixodes pacificus)*

**Regions:** Northeast, Mid-Atlantic, North Central, Pacific Coast

**Pathogen:** *Borrelia burgdorferi* (bacterium)

### Ehrlichiosis

**Tick:** Lone Star tick *(Amblyomma americanum)*

**Regions:** Southeast, South Central

**Pathogens:** *Ehrlichia chaffeensis*, *Ehrlichia ewingii* (bacteria)

### Anaplasmosis

**Ticks:** blacklegged or deer tick *(Ixodes scapularis)*, western blacklegged tick *(Ixodes pacificus)*

**Regions:** Upper Midwest, Northeast, Mid-Atlantic, North Central, Pacific Coast

**Pathogen:** *Anaplasma phagocytophilum* (bacterium)

### Babesiosis

**Tick:** blacklegged or deer tick *(Ixodes scapularis)*

**Regions:** Northeast, Upper Midwest, Pacific Coast

**Pathogens:** *Babesia microti*, *Babesia duncani* (protozoa)

### *Borrelia miyamotoi* disease

**Ticks:** blacklegged or deer tick *(Ixodes scapularis)*, western blacklegged tick *(Ixodes pacificus)*

**Regions:** Northeast, Mid-Atlantic, North Central, Pacific Coast

**Pathogen:** *Borrelia miyamotoi* (bacterium)

### Colorado tick fever

**Tick:** Rocky Mountain wood tick *(Dermacentor andersoni)*

**Regions:** Western U.S., Mountain

**Pathogen:** Colorado tick fever virus

### Q fever

**Tick:** Rocky Mountain wood tick *(Dermacentor andersoni)*

**Regions:** Mountain, East North Central, Pacific, West North Central, South Atlantic

**Pathogen:** *Coxiella burnetii* (bacterium)

### Tularemia

**Ticks:** Lone Star tick *(Amblyomma americanum)*, Rocky Mountain wood tick *(Dermacentor andersoni)*, American dog tick *(Dermacentor variabilis)*

**Regions:** West North Central, Mountain

**Pathogen:** *Francisella tularensis* (bacterium)

### Tick-borne relapsing fever (TBRF)

**Tick:** soft tick *(Ornithodoros)*

**Regions:** West, South, Southwest

**Pathogens:** *Borrelia hermsii* and other spp. (bacteria)

### Rocky Mountain spotted fever (RMSF)

**Ticks:** American dog tick *(Dermacentor variabilis)*, brown dog tick *(Rhipicephalus sanguineus)*, Rocky Mountain wood tick *(Dermacentor andersoni)*

**Regions:** Mountain, Pacific Coast, Southwest

**Pathogen:** *Rickettsia rickettsii* (bacterium)

### *Rickettsia parkeri* rickettsiosis (spotted fever)

**Tick:** Gulf Coast tick *(Amblyomma maculatum)*

**Regions:** Coastal U.S., along the Atlantic Coast and Gulf of Mexico

**Pathogen:** *Rickettsia parkeri* (bacterium)

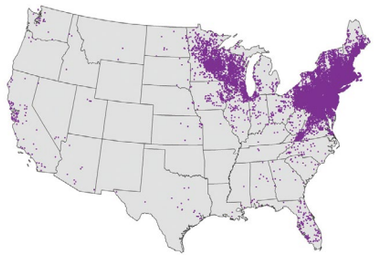
## **Key considerations** for diagnosing tick-borne diseases

- The prevalence of tick-borne diseases is rapidly increasing
- Co-infection may be common
- A high degree of symptom overlap exists amongst these conditions

## Knowing where cases have been reported can help you manage tick-borne diseases

The geographical range of tick-borne diseases has expanded—mostly due to the growing deer population—while land that was once cleared for farming has become reforested, attracting more tick hosts (like deer) and more suburban development.[1] Patients' everyday activities now put them in closer contact with wildlife—and ticks.

**Lyme disease: U.S. reported cases, 2015[2]**



**Rocky Mountain spotted fever: U.S. reported cases, 2015[2]**

Note: Each dot represents 1 case. Cases are reported from the infected person's county of residence, not necessarily the place where they were infected.

Note: In 2015, no cases of tick-borne illness were reported from Hawaii. In 2015, Alaska reported 1 travel-related case of Lyme disease and 2 cases of tularemia.

Please contact your Quest Diagnostics sales representative at **1.866.MYQUEST** (1.866.697.8378) for more information about our tick-borne disease testing or visit **QuestDiagnostics.com.**


**References**

1. National Institutes of Health. Tickborne diseases. Available at www.niaid.nih.gov/diseases-conditions/tickborne-diseases. Accessed April 27, 2017.
2. The Centers for Disease Control and Prevention. Tickborne diseases of the United States: a reference manual for health care providers. Fourth edition, 2017. Available at www.cdc.gov/lyme/resources/tickbornediseases.pdf. Accessed June 13, 2017.

# Make timely, differential tick-borne disease diagnoses
## with comprehensive testing from Quest

| Test Name | Test Code | CPT Code(s)* |
|---|---|---|
| *Anaplasma phagocytophilum* Antibodies (IgG, IgM)† | 34464(X) | 86666 (x2) |
| *Anaplasma phagocytophilum* DNA, Qualitative Real-Time PCR† | 17320 | 87798 |
| *Anaplasma phagocytophilum* and *Ehrlichia chaffeensis* Antibody Panel† | 10611(X) | 86666 (x4) |
| *Babesia duncani* (WA1) Antibody (IgG), IFA | 17231 | 86753 |
| *Babesia microti* DNA, Real-Time PCR† | 37314 | 87798 |
| *Babesia microti* Antibodies (IgG, IgM), IFA† | 34300 | 86753 (x2) |
| *Borrelia hermsii* Antibody Panel, IFA† | 34690 | 86619 (x2) |
| *Borrelia miyamotoi* DNA, Real-Time PCR, Miscellaneous† | 93795 | 87798 |
| *Borrelia miyamotoi* DNA, Real-Time PCR, Tick† | 93794 | 87798 |
| Colorado Tick Fever Antibody Panel, IFA | 34986 | 86790 (x2) |
| *Ehrlichia chaffeensis* (IgG, IgM)† | 34271(X) | 86666 (x2) |
| *Ehrlichia chaffeensis* DNA, Real-Time PCR | 11353 | 87798 |
| *Ehrlichia ewingii* DNA, Real-Time PCR**† | 43300 | 87798 |
| Febrile Antibodies Panel† | 91121 | 86757 (x4), 86622 (x2), 86768 (x5) |
| Febrile Antibodies and *Francisella* Panel† | 91122 | 86757 (x4), 86622 (x2), 86768 (x5), 86000 |
| *Francisella tularensis* Antibody, Direct Agglutination (DA) | 35176 | 86000 |
| *Francisella tularensis* Screen | 10443(X) | 87081 |
| Lyme Disease Ab with Reflex to Blot (IgG, IgM) | 6646 | 86618 |
| Lyme Disease Antibodies (IgG, IgM), Immunoblot | 8593 | 86617 (x2) |
| Lyme Disease Antibody (IgG), Immunoblot | 29477 | 86617 |
| Lyme Disease Antibodies (IgG, IgM), IBL, CSF | 70028 | 86617 (x2) |

| Test Name | Test Code | CPT Code(s)* |
|---|---|---|
| Lyme Disease (*Borrelia spp*) DNA, Qualitative, Real-Time PCR, Blood† | 15777 | 87801 |
| Lyme Disease (*Borrelia spp*) DNA, Qualitative, Real-Time PCR, CSF/ Synovial Fluid† | 15564 | 87801 |
| Lyme Disease (*Borrelia spp*) DNA, Qualitative, Real-Time PCR, Urine† | 15868 | 87801 |
| Real-Time PCR, Tick, Tick ID with Reflex to Lyme Disease DNA | 90558 | 87168 |
| Lyme Disease (*Borrelia spp*) DNA, Qualitative, Real-Time PCR, Tick† | 15510 | 87801 |
| Lyme Disease Antibody Index for CNS Infection | 34194 | 82040, 82042, 82784 (x2), 86618 (x4) |
| Malaria/Babesia/Other Blood Parasites | 831 | 87207 |
| Q Fever (*Coxiella burnetii*) Antibodies (IgG, IgM), with Reflex to Titers | 37071 | 86638 (x4) |
| *Rickettsia* (RMSF) Antibodies (IgG, IgM) with Reflex to Titers | 6419 | 86757 (x2) |
| *Rickettsia* Antibody Panel with Reflex to Titers | 37507 | 86757 (x4) |
| *Rickettsia conorii* Antibody Panel, IFA‡ | 15332(X) | 86757(x2) |
| *Rickettsia* (Typhus Fever) Antibodies (IgG, IgM) with Reflex to Titers | 37503 | 86757 (x2) |
| *Rickettsia rickettsii* DNA, Real-Time PCR† | 70191 | 87798 |
| Rickettsial Disease Panel | 37478 | 86638 (x4), 86757 (x4) |
| Tick (and Other Arthropods) Identification | 3946(X) | 87168 |
| **NEW: Tick-Borne Disease, Acute Molecular Panel** | **94322** | **87798 (x4), 87801** |

* The CPT codes provided are based on AMA guidelines and are for informational purposes only. CPT coding is the sole responsibility of the billing party. Please direct any questions regarding coding to the payer being billed.

** Available from Quest Diagnostics Infectious Diseases, Inc.

† This test was developed and its analytical performance characteristics have been determined by Quest Diagnostics. It has not been cleared or approved by the U.S. Food and Drug Administration. This assay has been validated pursuant to the CLIA regulations and is used for clinical purposes.

‡ Available from Quest Diagnostics Nichols Institute, Chantilly, VA.

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### References


1. National Institute of Health. Tickborne diseases. Available at www.niaid.nih.gov/diseases-conditions/tickborne-diseases. Accessed April 27, 2017.
2. Lymedisease.org. About Lyme disease co-infections. Available at www.lymedisease.org/lyme-basics/co-infections/about-co-infections. Accessed May 16, 2017.
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4. The Centers for Disease Control and Prevention. Geographic distribution of ticks that bit humans. Available at www.cdc.gov/ticks/geographic_distribution.html. Accessed May 5, 2017.
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7. The Centers for Disease Control and Prevention. CDC public health grand rounds: emerging tickborne diseases. 21 Mar 2017. Available at www.cdc.gov/cdcgrandrounds/archives/2017/March2017.htm. Accessed June 13, 2017.
8. Centers for Disease Control and Prevention. Lyme disease: two-step laboratory testing process. Available at www.cdc.gov/lyme/diagnosistesting/labtest/twostep/index.html. Accessed July 20, 2017.


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