

THIS IS AN OFFICIAL NH DHHS HEALTH ALERT

Distributed by the NH Health Alert Network
Health.Alert@dhhs.nh.gov
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NH-HAN 20180518



Tickborne Diseases in New Hampshire

Key Points and Recommendations:

1. Blacklegged ticks transmit at least five different infections in New Hampshire (NH): Lyme disease, Anaplasma, Babesia, Powassan virus, and *Borrelia miyamotoi*.
2. NH has one of the highest rates of Lyme disease in the nation, and 50-60% of blacklegged ticks sampled from across NH have been found to be infected with *Borrelia burgdorferi*, the bacterium that causes Lyme disease.
3. NH has experienced a significant increase in human cases of anaplasmosis, with cases more than doubling from 2016 to 2017. The reason for the increase is unknown at this time.
4. The number of new cases of babesiosis also increased in 2017; because Babesia can be transmitted through blood transfusions in addition to tick bites, providers should ask patients with suspected babesiosis whether they have donated blood or received a blood transfusion.
5. Powassan is a newer tickborne disease which has been identified in three NH residents during past seasons in 2013, 2016 and 2017. While uncommon, Powassan can cause a debilitating neurological illness, so providers should maintain an index of suspicion for patients presenting with an unexplained meningoencephalitis.
6. *Borrelia miyamotoi* infection usually presents with a nonspecific febrile illness similar to other tickborne diseases like anaplasmosis, and has recently been identified in one NH resident. Tests for Lyme disease do not reliably detect *Borrelia miyamotoi*, so providers should consider specific testing for *Borrelia miyamotoi* (see Attachment 1) and other pathogens if testing for Lyme disease is negative but a tickborne disease is still suspected.
7. Report all tickborne diseases, confirmed or suspected, to the Bureau of Infectious Disease Control at 603-271-4496 (after hours 603-271-5300). For more information about testing for specific pathogens, please review the "tickborne disease diagnostic testing" section below.

Background:

NH has evidence of local transmission of five tickborne diseases. Lyme disease (*Borrelia burgdorferi*), babesiosis (*Babesia spp.*), anaplasmosis (*Anaplasma phagocytophilum*), Powassan virus, and *Borrelia miyamotoi* are transmitted by the bite of the blacklegged tick (*Ixodes scapularis*). Although the lifespan of this tick is two years, people are most likely to be infected between April and August when the aggressive nymph stage is active. Nymphs are very small (< 2mm) and difficult to see unless they become engorged with blood. Household

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pets commonly bring ticks in from outdoors that can serve as a source of infection for their owners.

Epidemiology:

Lyme disease has been identified in all 10 NH counties. Anaplasmosis and babesiosis continue to increase across the state. Powassan virus is rare, with only three reported cases, one in 2013, one in 2016, and one in 2017. One case of *B. miyamotoi* was identified in a NH resident in early 2018. Additional data can be found on our website at:

<http://www.dhhs.nh.gov/dphs/cdcs/lyme/publications.htm>.

Table 1. Tickborne disease incidence in New Hampshire by year, 2013-2017.

	2013	2014	2015	2016	2017
Lyme Disease	1691	1416 ¹	1371 ¹	1480 ¹	NA ²
Anaplasmosis	88	130	110	135	317
Babesiosis	22	40	53	16 ³	76
Powassan Virus	1	0	0	1	1

1. The number of cases of Lyme disease for 2014 - 2016 was estimated based on the number of reports received and historical data.

2. NA = Not available. Data are incomplete due to volume of reports received and a backlog of processing.

3. Babesia surveillance is incomplete for 2016

Tick testing performed during 2013-2014 on a convenience sample of ticks in NH showed that >50% of adult ticks tested in most counties were infected with the bacteria causing Lyme disease with the exception of Carroll, Cheshire, Coos and Sullivan counties where very low numbers of ticks were collected, precluding prevalence assessment. *Babesia* and *Anaplasma* have also been detected in ticks in NH, although reliable prevalence data for these pathogens in ticks is not available. Tick surveillance maps by county from 2013-2014 are available at: <http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/blacklegged13-14.pdf>.

Borrelia miyamotoi was first identified in 1995 in ticks from Japan, and the first human cases were identified in Russia in 2011. Fewer than 60 human cases have been well documented in the United States. NH has had one human case, which was identified in 2018; surrounding states have also reported cases. NH ticks have tested positive for *B. miyamotoi* (<https://www.tickreport.com>).

Symptoms:

Many tickborne diseases present initially with nonspecific flu-like symptoms that may include fever, chills, malaise, headache, muscle and joint pains, and lymphadenopathy. Some may also present with other systemic symptoms (neurological, cardiovascular, gastrointestinal symptoms). Powassan (POW) virus infection, in particular, can progress to meningoencephalitis. About half of those that survive clinical disease have permanent neurological sequelae.

For more information about specific clinical syndromes associated with the different tickborne diseases, please review the following:

- Lyme disease: https://www.cdc.gov/lyme/signs_symptoms/index.html

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- Anaplasmosis: <https://www.cdc.gov/anaplasmosis/symptoms/index.html>
- Babesiosis: <https://www.cdc.gov/parasites/babesiosis/disease.html>
- Powassan: <https://www.cdc.gov/powassan/symptoms.html>
- *Borrelia miyamotoi*: <https://www.cdc.gov/ticks/miyamotoi.html>
<https://www.ncbi.nlm.nih.gov/pubmed/26053877>

Diagnostic Testing:

For Lyme disease, anaplasmosis, and babesiosis providers should use their already established clinical testing networks.

Powassan virus testing should be coordinated through the State of New Hampshire's Public Health Laboratories by calling the Bureau of Infectious Disease Control.

For testing information on *Borrelia miyamotoi*, please see attachment 1.

If you suspect another tickborne disease for which testing may be limited or not accessible, please contact the Bureau of Infectious Disease Control at 603-271-4496 (after hours 603-271-5300).

Treatment:

For guidelines on treatment of Lyme disease, anaplasmosis, and babesiosis, please see the most current IDSA guidelines: <http://www.idsociety.org/Organism/#LymeDisease>.

These guidelines are in the process of being reviewed and updated, but are still the most current guidelines. A more recent review of the literature was conducted by Dr. Sanchez and colleagues (published in JAMA 2016) which was intended to provide an update on diagnosis, treatment, and prevention of tickborne infections and can serve as a helpful resource to clinicians: <https://www.ncbi.nlm.nih.gov/pubmed/27115378>.

Some newer data indicate that 10 days of doxycycline therapy for early Lyme disease may be sufficient and have comparable treatment outcomes to longer courses of therapy:

- Sanchez et al. JAMA 2016: <https://www.ncbi.nlm.nih.gov/pubmed/27115378>
- Stupica et al. Clin Infect Dis 2012: <https://www.ncbi.nlm.nih.gov/pubmed/22523260>
- Kowalski et al. Clin Infect Dis 2010: <https://www.ncbi.nlm.nih.gov/pubmed/20070237>
- CDC Webpage on Treatment: <https://www.cdc.gov/lyme/treatment/index.html>

Data on treatment for *Borrelia miyamotoi* is limited, but case reports suggest treatment is likely similar to that of Lyme disease. In patients diagnosed with *Borrelia miyamotoi*, we suggest consultation with an Infectious Disease specialist.

There is no specific treatment for Powassan infection and care is supportive.

Reporting Tickborne Diseases:

Clinicians should report suspected and confirmed cases of all tick-borne diseases to the Bureau of Infectious Disease Control by submission of a case report form or by calling 603-271-4496 (after hours 603-271-5300). Please be sure to record the date of symptom onset and exposure

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history. Completed forms can be mailed or faxed to the Bureau of Infectious Disease Control at 29 Hazen Drive, Concord, NH, 03301 (Fax: 603-271-0545).

Please utilize the following case report forms:

- Lyme disease: <http://www.dhhs.nh.gov/dphs/cdcs/documents/lymediseasereport.pdf>
- Tickborne Rickettsial Diseases: https://www.cdc.gov/ticks/forms/2010_tbrd_crf.pdf
- Babesia: <https://www.cdc.gov/parasites/babesiosis/resources/50.153.pdf>.
- Other tickborne diseases:
<https://www.dhhs.nh.gov/dphs/cdcs/documents/diseasereport.pdf>

Prevention:

An individual's risk of tickborne disease depends on their outdoor activities and the abundance of infected ticks. All tickborne diseases are prevented the same way. There are options for personal protection through the use of appropriate clothing and repellents, as well as options for environmental management and control. The use of environmental management and control is successful in preventing tick encounters, thereby reducing the risk of tick bites. There are several resources available to educate your patients about how to reduce their risk of tick encounters and tick bites.

State of New Hampshire Tickborne Disease Prevention Plan:
<https://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/tbdpreventionplan.pdf>

University of New Hampshire Cooperative Extension's Biology and Management of Ticks in New Hampshire:
https://extension.unh.edu/resources/files/Resource000528_Rep1451.pdf

Connecticut Agricultural Experiment Station's Tick Management Handbook:
<http://www.ct.gov/caes/lib/caes/documents/publications/bulletins/b1010.pdf>

CDC Tick Bite Prevention:
<https://www.cdc.gov/ticks/avoid/index.html>

Prevention Messages for Patients:

- Avoid tick-infested areas when possible and stay on the path when hiking to avoid brush.
- Wear light-colored clothing that covers arms and legs so ticks can be more easily seen.
- Tuck pants into socks before going into wooded or grassy areas.
- Apply insect repellent (20-30% DEET) to exposed skin. Other repellent options may be found here: https://www.epa.gov/insect-repellents/find-insect-repellent-right-you#search_tool
- Permethrin is highly effective at repelling ticks on clothing; it is not meant for use on skin.
- Outdoor workers in NH are at particular risk of tickborne diseases and they should be reminded about methods of prevention.
- Perform daily tick checks to look for ticks on the body, especially warm places like behind the knees, behind the ears, the groin, and the back of neck.
- Pets returning inside may also bring ticks with them. Performing tick checks and using tick preventatives on pets will minimize this occurrence.
- Encourage landscape or environmental management to reduce tick habitat and encounters.
- Shower soon after returning indoors to wash off any unattached ticks and check clothes for any ticks that might have been carried inside. Placing dry clothes in the dryer on high heat for ten minutes or one hour for wet or damp clothes effectively kills ticks.
- Remove ticks promptly using tweezers. Tick removal within 36 hours of attachment can prevent Lyme disease, but transmission of other tickborne diseases can occur with shorter periods of attachment time.

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- Monitor for signs and symptoms of tickborne diseases for 30 days after a tick bite. Patients should contact their healthcare provider if symptoms develop.

Additional Resources:

New Hampshire Tickborne Disease Page	https://www.dhhs.nh.gov/dphs/cdcs/lyme/
NH Tickborne Disease Prevention Plan	http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/tbdpreventionplan.pdf
Tickborne Diseases of the United States: A Reference Manual for Health Care Providers, Second Edition (CDC)	https://www.cdc.gov/lyme/resources/TickborneDiseases.pdf
Tickborne Disease (CDC)	https://www.cdc.gov/ticks/index.html
Powassan (CDC)	https://www.cdc.gov/powassan/
<i>Borrelia miyamotoi</i> (CDC)	https://www.cdc.gov/ticks/miyamotoi.html

For any questions regarding the contents of this message, please contact NH DHHS, DPHS, Bureau of Infectious Disease Control at 603-271-4496 (after hours 603-271-5300).

To change your contact information in the NH Health Alert Network, contact Adnela Alic at 603-271-7499 or adnela.alic@dhhs.nh.gov.

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 From: Benjamin P. Chan, MD, MPH – State Epidemiologist
 Originating Agency: NH Department of Health and Human Services, Division of Public Health Services

Attachments: 1. *Borrelia miyamotoi* lab testing table, 2. Lyme disease prophylaxis guidelines
 3. NH Lyme Disease Case Report Form 4. NH Confidential Communicable Disease Report Form

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ATTACHMENT 1

***Borrelia miyamotoi* lab testing**

Currently, confirmation of a diagnosis relies on 1) the use of polymerase chain reaction (PCR) tests that detect DNA from the organism (preferred) or 2) antibody-based tests. Both types of tests are under development and not widely commercially available but can be ordered from a limited number of CLIA-approved laboratories.

Less sensitive and specific methods for detecting *B. miyamotoi* and agents of tickborne relapsing fever include identification of spirochetes in peripheral blood films and spinal fluid preparations and serologic testing.

Lab	Test	Specimen	Volume	Storage	Shipping	Turnaround time	Comments
Imugen	<i>Borrelia</i> PCR	CSF, Synovial Fluid or EDTA Whole Blood	2.0 ml (0.5 ml minimum)	Refrigerate	Ambient	24-48 hours from receipt	Doesn't differentiate between <i>B. burgdorferi</i> and <i>B. miyamotoi</i>
Imugen	<i>B. miyamotoi</i> serology (IgM and IgG)	Serum or CSF	2.0 ml (0.5 ml minimum)	Refrigerate	Ambient	24-48 hours from receipt	Most patients acutely symptomatic with <i>Borrelia miyamotoi</i> infection are seronegative. If the clinical history strongly suggests infection, collect/submit a convalescent specimen 3-4 weeks later.
Mayo	<i>B. miyamotoi</i> PCR	EDTA whole blood	1.0 ml (0.3 ml minimum volume)	Refrigerate	Ambient	Unknown	
Quest	<i>B. miyamotoi</i> PCR	CSF, synovial fluid, whole blood (EDTA)	1.0 ml (0.3 ml minimum volume)	Refrigerate	Ambient	Unknown	

ATTACHMENT 2

**Tick bites and single-dose doxycycline as prophylactic treatment for Lyme disease in NH
(Based on the 2006 Infectious Disease Society of America guidelines)**

A **single** dose of doxycycline (200 mg) may be offered to adult patients and to children ≥ 8 years of age (4 mg/kg up to a maximum dose of 200 mg) when ALL of the following conditions exist:

1. The attached tick is a blacklegged tick (deer tick, *Ixodes scapularis*). Tick identification is most accurately performed by an individual trained in this discipline. However, blacklegged ticks are very common in southeastern and central New Hampshire and there are many images available online to help identification.

AND

2. The tick has been attached for at least 36 hours. This determination can be made by asking the patient about outdoor activity in the time before the tick bite was noticed to estimate attachment time, or by asking about degree of engorgement. Unengorged (unfed) blacklegged ticks are typically flat. Any deviation from this “flatness,” which is often accompanied by a change in color from brick red to a gray or brown, is an indication that the tick has been feeding.

AND

3. Prophylaxis can be started within 72 hours of the time that the tick was removed. This time limit is suggested because of an absence of data on the efficacy of prophylaxis for tick bites following longer time intervals after tick removal.

AND

4. Doxycycline prophylaxis is not contraindicated. Doxycycline is relatively contraindicated in pregnant women and children less than 8 years old. The other common antibiotic treatment for Lyme disease, amoxicillin, is not recommended for prophylaxis because of an absence of data on an effective short-course prophylaxis regimen, the likely need for a multi-day regimen along with its possible adverse effects, and the excellent efficacy of treatment if signs or symptoms do develop.

Note that single-dose doxycycline is not 100% effective for prevention of Lyme disease; consequently, patients who receive this therapy should monitor themselves for the development of Lyme disease as well as other tickborne diseases including anaplasmosis and babesiosis.

Adapted from: Wormser GP, et al. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America. *Clinical Infectious Diseases*; 2006; 43:1089 –1134. Available online at: <http://cid.oxfordjournals.org/content/43/9/1089.full>

New Hampshire Confidential Communicable Disease Report Form 2017

Disease: _____ Report Date: ____/____/____

NH RSA 141-C and **He-P301** mandate reporting of suspect and confirmed cases of these conditions by healthcare providers and labs.

Report diseases with an (*) within 24 hours of diagnosis
All others must be reported within 72 hours of diagnosis

PATIENT INFORMATION:

Name _____
(Last) (First) (M.I.)

Date of Birth ____/____/____ Age _____ Male Female

Address _____

City/Town _____ State _____ Zip _____

Phone: Cell _____ Home _____ Work _____

Occupation/Employment _____

Miscellaneous Information (*check all that apply*):

- Healthcare Worker Pregnant # of weeks: _____
- Nursing Home Resident Deceased
- Child Care Attendee / Worker Hospitalized
- Food Service Worker if yes, where? _____

Race: White Black Asian Pacific Islander Native Am./Alaskan Nat
 Unknown Other _____

Ethnicity: Hispanic Not Hispanic Unknown

Is patient aware of diagnosis? Yes No Unknown

SYMPTOMS AND TREATMENT INFORMATION:

Symptom Onset Date: ____/____/____ Diagnosis Date: ____/____/____

Type of Test: _____ Date of Test ____/____/____

Specimen Source: Blood Cervix Stool Urethra Urine Rectum
 Pharynx Unknown Other (*specify*): _____

Treatment: Date: ____/____/____ Drug: _____

Dosage: _____ Days: _____

REPORTING INFORMATION:

Reported by _____ Phone _____

Healthcare Provider _____ Phone _____

Name of Facility _____

City/Town _____ State _____ Zip _____

Notes or additional information: _____

- Acute Flaccid Myelitis
- Acquired Immune Deficiency Syndrome (AIDS)
- Anaplasmosis [Anaplasma Phagocytophilum]
- Anthrax [Bacillus anthracis]*
- Arboviral infection, including EEE, WNV, Dengue, Powassan, Zika*
- Babesiosis [Babesia microti]
- Botulism [Clostridium botulinum]*
- Brucellosis [Brucella abortus]*
- Campylobacteriosis [Campylobacter species]
- Carbapenem-resistant enterobacteriaceae
- Chlamydial infection [Chlamydia trachomatis]
- Cholera [Vibrio cholerae]*
- Coccidioidomycosis [Coccidioides immitis]
- Creutzfeldt-Jakob Disease*
- Cryptosporidiosis [Cryptosporidium parvum]
- Cyclospora infection [Cyclospora cayetanensis]
- Diphtheria [Corynebacterium diphtheriae]*
- Ehrlichiosis [Ehrlichia species]
- Escherichia coli O157 infection and other shiga toxin producing E. coli
- Giardiasis [Giardia lamblia]
- Gonorrhea [Neisseria gonorrhoeae]
- Haemophilus influenzae, invasive disease, sterile site*
- Hantavirus Pulmonary Syndrome [Hantavirus]*
- Hemolytic Uremic Syndrome (HUS)
- Hepatitis, viral: A*, E,
- Hepatitis, viral: positive B surface antigen in a pregnant woman
- Hepatitis, viral: B, C (new diagnoses from providers only, no lab reporting)
- Human Immunodeficiency Virus (HIV), including perinatal exposure
- Human Immunodeficiency Virus-related CD4+ counts and all viral loads
- Legionellosis [Legionella pneumophila]
- Leprosy, Hansen's disease [Mycobacterium leprae]
- Leptospirosis [Leptospira species]
- Listeriosis [Listeria monocytogenes]
- Lyme disease [Borrelia burgdorferi]
- Malaria [Plasmodium species]
- Measles [Rubeola]*
- Mumps*
- Neisseria meningitidis, invasive disease, sterile site*
- Pertussis [Bordetella pertussis]*
- Plague [Yersinia pestis]*
- Pneumococcal disease, invasive [Streptococcus pneumoniae]
- Pneumocystis pneumonia [Pneumocystis jiroveci formerly carinii]
- Poliomyelitis [Polio]*
- Psittacosis [Chlamydia psittaci]*
- Rabies in humans or animals*
- Rocky Mountain Spotted Fever [Rickettsia rickettsii]
- Rubella, including Congenital Rubella Syndrome*
- Salmonellosis [Salmonella species] (report S. Typhi* within 24 hours)
- Shigellosis [Shigella species]
- Syphilis, including Congenital Syphilis Syndrome [Treponema pallidum]
- Tetanus [Clostridium tetani]
- Toxic-Shock Syndrome (TSS) [strepococcal or staphylococcal]
- Trichinosis [Trichinella spiralis]
- Tuberculosis disease [Mycobacterium tuberculosis]*
- Tuberculosis infection, latent (lab reporting only, no provider reporting)
- Tularemia [Francisella tularensis]*
- Typhoid fever [Salmonella Typhi]*
- Typhus [Rickettsia prowazekii]*
- Varicella
- Vibriosis [any Vibrio species]*
- Vancomycin Resistant Staphylococcus aureus (VRSA)*
- Yersiniosis [Yersinia enterocolitica]
- Any suspect outbreak, cluster of illness, unusual occurrence of disease, or other incident that may pose a public health threat.*
- Any investigation of suspected or actual incident of diversion of injectable medications in a health care setting.

How to Report a Communicable Disease

Business Hours (Monday – Friday 8:00am – 4:30pm): 1-603-271-4496
Toll Free (in NH only) 1-800-852-3345 ext. 4496
After Hours (urgent matters only): 1-603-271-5300
Toll Free After Hours (in NH only): 1-800-852-3345 ext. 5300
Fax: 1-603-271-0545 **DO NOT FAX HIV reports**
Electronically: Call during Business Hours to request an online account

**NEW HAMPSHIRE LYME DISEASE CASE REPORT FORM
HEALTH CARE PROVIDER**

Patient's Name _____ Report Date _____

(Last Name) (First Name)

Date of Birth _____ Age _____ Male Female Unknown

Address _____

City / Town _____ County _____ State _____ Zip _____

Home Phone _____ Work Phone _____

Occupation: _____

- Race**
- White
 - African American
 - Asian
 - Hawaiian or Pacific Islander
 - Native Am./Alaskan Native
 - Other
 - Unknown

- Ethnicity**
- Hispanic
 - Not Hispanic
 - Unknown

SYMPTOMS AND SIGNS OF CURRENT EPISODE (Please answer each question)

Is this person being diagnosed with Lyme Disease?..... Yes No

Date of symptom onset _____ Onset date unknown Date of Lyme Disease diagnosis _____

DERMATOLOGIC:

Erythema migrans (physician diagnosed EM at least 5 cm in diameter)?..... Yes No Unknown

RHEUMATOLOGIC:

Arthritis characterized by recurrent brief attacks of joint swelling? Yes No Unknown

NEUROLOGIC:

Bell's palsy or other cranial neuritis? Yes No Unknown

Radiculoneuropathy? Yes No Unknown

Lymphocytic meningitis? Yes No Unknown

Encephalitis/Encephalomyelitis? Yes No Unknown

CSF tested for antibodies to *B. burgdorferi*? Yes No Unknown

Antibody to *B. burgdorferi* higher in CSF than serum Yes No Unknown

CARDIOLOGIC:

Acute onset 2nd or 3rd degree atrioventricular block? Yes No Unknown

Pregnant: Yes No Unknown

Hospitalized: Yes No Unknown If yes, where _____

Treatment: Doxycycline Amoxicillin Other: _____

Duration of treatment in days: _____

Has this patient been diagnosed with Lyme Disease prior to this diagnosis? Yes, date (mm/yyyy) _____ No Unknown

EXPOSURE HISTORY

Tick Bite reported within 30 days of onset: Yes No Unknown

In the 30 days prior to symptom onset, did this individual travel outside of NH: Yes, out of state Yes, out of country
 No Unknown

County and state most likely exposed? _____

LABORATORY RESULTS (Check all that apply)

EIA/IFA: Positive Equivocal Negative Not done/Unknown Date if positive: _____

Western Blot: IgM Positive IgM Negative Not done/Unknown Date if positive: _____

IgG Positive IgG Negative Not done/Unknown Date if positive: _____

Culture Results/Other: _____

HEALTH CARE PROVIDER REPORTING INFORMATION:

Reported by _____

Ordering Provider _____ Phone _____

Provider Facility _____

City/Town _____ State _____ Zip _____

For NH DHHS Staff Only

Imported

- Acquired in NH
- Acquired Outside US
- Acquired in Another State
- Unknown

Case Status

- Confirmed (meets CDC definitions)
- Probable (meets CDC definitions)
- Suspected (meets CDC definitions)
- Not A Case
- Out of state

Notes: