Tick-Borne Infections Council of North Carolina, Inc.

NEWSLETTER 2026, Volume 1

Quote: "Tick- and mosquito-borne diseases in the United States are occurring at increasing rates and are heterogeneously distributed among the states. The allocation of public health resources and the attention of a research community on ticks and mosquitoes should be proportional to the number of reported human disease cases in each state."
Tian, Y., et al.; Journal of Medical Entomology (2025); https://doi.org/10.1093/jme/tjaf100

Highlights

- **Tick and tick-borne disease prevalence in two suburban counties in Central North Carolina**
  Summary: Routine behaviors and exposures can expose people to spotted fever group rickettsioses and ehrlichiosis in suburban areas in North Carolina.
- **Correlates and spatial distribution of Amblyomma americanum and tick-borne pathogens in Virginia**
  Summary: Taking a fine-scale spatial approach, edge habitats and forest variables were found to significantly affect *A. americanum* abundance and can serve as targets for control interventions.
- **Ticks on a college campus in Georgia**
  Summary: Ticks carrying tick-borne rickettsiae can be found in small-scale green urban areas, like college campuses, and thus people using these spaces may be at risk for infection.
- **Powassan in Illinois**
- **Lyme disease diagnoses among Medicaid and Medicare beneficiaries in the United States**
  Summary: There are differences in Lyme disease diagnoses across race and ethnic groups in the United States, based on healthcare claim data. The most pronounced

difference was in children, particularly Black/African-American children, who had more than twice the prevalence of severe, disseminated disease than did White children.

- **Risk factors for Lyme disease in the general public from a survey in 28 states**
  Summary: Despite awareness of Lyme disease and its transmission, fewer than half of respondents reported routinely using personal prevention measures to reduce risk of acquiring tick-borne diseases.

- **Rickettsia rickettsii in Haemaphysalis longicornis**
  Summary: Rocky Mountain spotted fever normally circulates in North America in *Dermacentor* and *Rhipicephalus sanguineus* ticks, but they have now been found for the first time in *Haemaphysalis longicornis* ticks too.

- **Risk of Lone Star Tick establishment in California**
  Summary: *Amblyomma americanum* is not yet established in California, but California has a suitable climate for it. This study found all life stages of *A. americanum* in multiple counties of California, raising concerns for establishment.

- **Demographic and behavioral risk factors for tick encounters in Maine**
  Summary: This study identified factors associated with risk of tick encounters in Maine, like use of personal protection measures, age, activities, and spatial differences.

- **Fatal tick-borne encephalitis in a traveler from the United States in Switzerland**
  Summary: A United States traveler vacationing in Switzerland died after contracting tick-borne encephalitis, likely while hiking in forested areas in the country. There is need to emphasize personal protective measures and vaccination in endemic regions.

- **New Rickettsia species found in dogs**
  Summary: A new *Rickettsia* species was discovered in dogs in the United States. Here, the authors characterize its genome and phylogeny.

- **First known death in the United States associated with alpha-gal syndrome**
  Summary: The authors here provide one of the most comprehensive cohorts looking at childhood-onset alpha-gal syndrome, and is the first case series from the Central Black Sea Region, where tick exposure is prevalent.

TIC-NC Activities

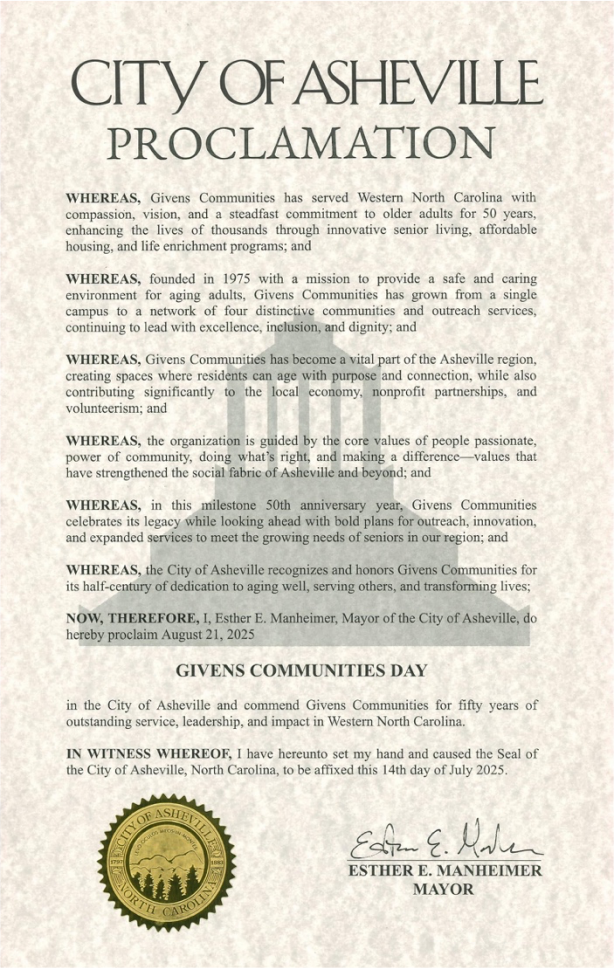
TIC-NC 20 Years Anniversary

TIC-NC was featured for its 20th anniversary in the November Headlines Newsletter of North Carolina Health News.

North Carolina Health News
Headlines Newsletter
November 17, 2025

Making Science Accessible: A Talk on Bacteria

Newsletter co-editor, Melody Xiao was invited to speak about bacteria at the Durham County Main Library as part of the "Who, What, Where, When, Why" speaker series in December 2025. The speaker series aims to make the work of scientists in the Triangle more accessible to the general public.



CITY OF ASHEVILLE

PROCLAMATION

WHEREAS, Givens Communities has served Western North Carolina with compassion, vision, and a steadfast commitment to older adults for 50 years, enhancing the lives of thousands through innovative senior living, affordable housing, and life enrichment programs; and

WHEREAS, founded in 1975 with a mission to provide a safe and caring environment for aging adults, Givens Communities has grown from a single campus to a network of four distinctive communities and outreach services, continuing to lead with excellence, inclusion, and dignity; and

WHEREAS, Givens Communities has become a vital part of the Asheville region, creating spaces where residents can age with purpose and connection, while also contributing significantly to the local economy, nonprofit partnerships, and volunteerism; and

WHEREAS, the organization is guided by the core values of people passionate, power of community, doing what's right, and making a difference—values that have strengthened the social fabric of Asheville and beyond; and

WHEREAS, in this milestone 50th anniversary year, Givens Communities celebrates its legacy while looking ahead with bold plans for outreach, innovation, and expanded services to meet the growing needs of seniors in our region; and

WHEREAS, the City of Asheville recognizes and honors Givens Communities for its half-century of dedication to aging well, serving others, and transforming lives;

NOW, THEREFORE, I, Esther E. Manheimer, Mayor of the City of Asheville, do hereby proclaim August 21, 2025

GIVENS COMMUNITIES DAY

in the City of Asheville and commend Givens Communities for fifty years of outstanding service, leadership, and impact in Western North Carolina.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of the City of Asheville, North Carolina, to be affixed this 14th day of July 2025.

ESTHER E. MANHEIMER
MAYOR

Recognizing a Dedicated Volunteer

Big thanks to our volunteer, Janet Dooley, who every year gets the City of Asheville to issue this proclamation for TICK-BORNE DISEASES AWARENESS MONTH.

Thank you, Janet!

North Carolina

Tick (Acari: Ixodidae) and tick-borne pathogen prevalence in two suburban counties in Central North Carolina

North Carolina reports high incidences of spotted fever group rickettsiosis (SFGR) and ehrlichiosis, with cases concentrated in the more urban and suburban central area of the state. To define the spatial distribution of ticks and the prevalence of tick-borne pathogens in this region, tick surveillance was conducted via (1) drag sampling and (2) passive canine surveillance. Drag sampling was conducted in 18 suburban green spaces (eg, parks, sports fields) in Chatham and Orange counties between June and August 2022. During the same timeframe, animal shelters and veterinary clinics in these counties also submitted ticks found attached to dogs. One hundred eight ticks were collected, 40 of which were from suburban green spaces and 68 from canine sampling, with Amblyomma americanum (L.) ticks comprising the majority of each subgroup. Ehrlichia chaffeensis and Ehrlichia ewingii were largely

concentrated in the canine sample and were present in 12% and 41% of A. americanum ticks, respectively. Rickettsia amblyommatis was the most frequently encountered pathogen overall and was detected in 30% of A. americanum from green spaces and 50% of the canine sample. In suburban green spaces, 50% of Amblyomma maculatum (Koch) ticks were positive for Rickettsia parkeri, while none of the Dermacentor variabilis (Say) ticks were positive for Rickettsia rickettsii. These results suggest that the risk of acquiring SFGR or ehrlichiosis may extend beyond rural risk factors (ie, camping, hunting, hiking) and into routine exposures in suburban counties.

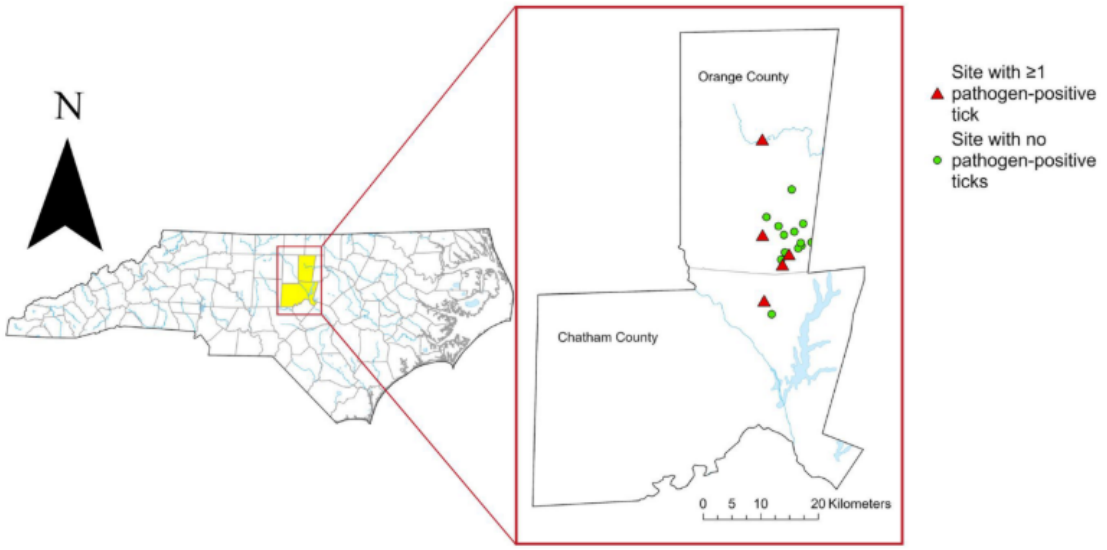


Fig. 1. Map of suburban green spaces in Chatham and Orange counties, central NC, where drag sampling was performed. Triangles indicate sites where at least one pathogen-harboring tick was collected. Circles indicate sites where no pathogen-harboring ticks were collected.

Schulz, A.E., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf180

Summary: Routine behaviors and exposures can expose people to spotted fever group rickettsioses and ehrlichiosis in suburban areas in North Carolina.

The South

Survey of Coyotes (*Canis latrans*) for Vector-Borne and Bacterial Pathogens in South Carolina and Tennessee, USA

Coyotes (*Canis latrans*) can serve as hosts for many pathogens of concern and may be useful for monitoring the prevalence and emergence of these pathogens. We collected serum and/or whole blood antemortem from 43 coyotes from South Carolina, USA, and collected samples from opportunistically collected carcasses from 71 Tennessee, USA and 15 South Carolina, USA coyotes. We tested samples with SNAP 4Dx PLUS rapid ELISA tests for *Ehrlichia* spp., *Anaplasma* spp., *Dirofilaria immitis*, and *Borrelia burgdorferi* and with microscopic agglutination tests for *Leptospira* spp. Real-time and conventional PCR for *B. burgdorferi* were performed on *Ixodes scapularis* ticks from Tennessee coyotes, detecting *B. burgdorferi* DNA in 5% of tested

ticks. We found 43% (28/65) of Tennessee coyotes were seropositive for *B. burgdorferi* compared to only 2% (1/52) of South Carolina coyotes. Coyotes were also seropositive for *Ehrlichia* spp. (66% [43/65] in Tennessee; 21% [11/52] in South Carolina) and *Anaplasma* spp. (26% [14/65] in Tennessee). Three Tennessee coyotes were PCR-positive for *Leptospira* spp., including two sequences most similar to *Leptospira santarosai* and one most similar to *Leptospira interrogans.* A total of 25% of coyotes (23/91) were seropositive for *Leptospira* spp., and interstitial nephritis was associated with *Leptospira* spp. seropositivity. This study demonstrates the expanded geographic range of *B. burgdorferi* in the southeast and the high prevalence of zoonotic pathogens in the coyote populations of Tennessee and South Carolina.

Baker, E., et al.; *Journal of Wildlife Diseases* (2025); https://doi.org/10.7589/JWD-D-24-00206

Summary: Coyotes may serve as hosts for pathogens of concern, including tick-borne ones like *B. burgdorferi*, *Ehrlichia* spp., *Anaplasma* spp., and *Leptospira* spp.

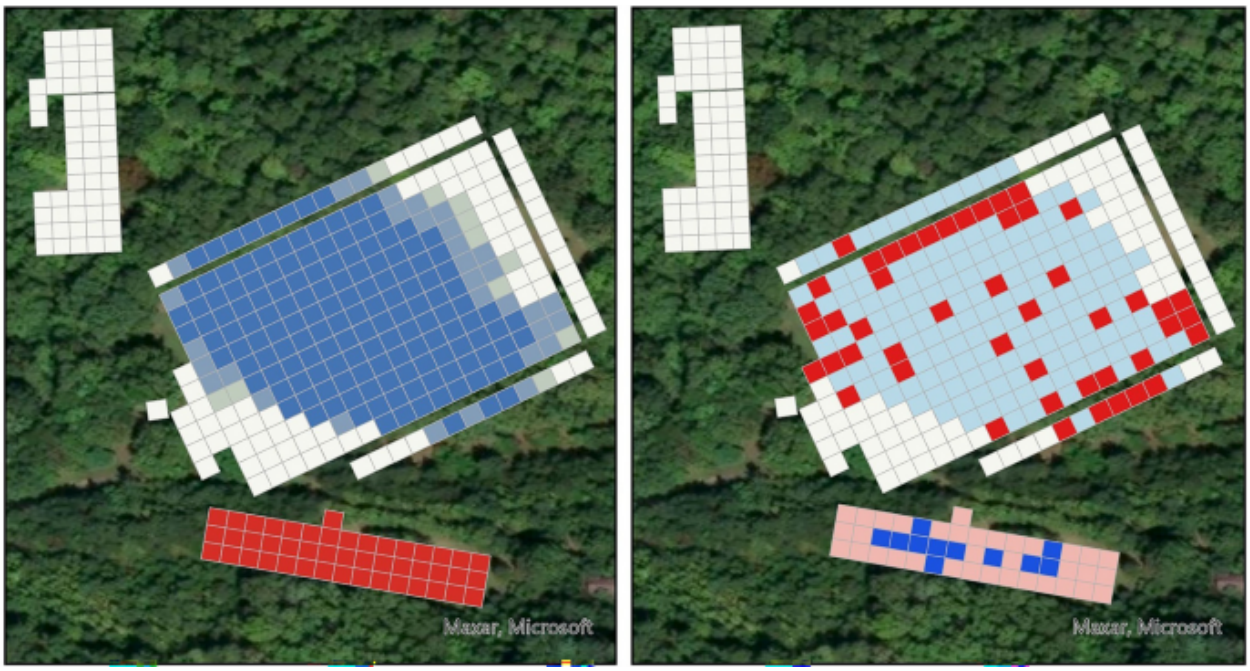
Environmental correlates and fine-scale distribution of *Amblyomma americanum*, *Ehrlichia* spp., and *Rickettsia amblyommatis* at a single site in south-central Virginia

Background: As tick-borne disease cases surge in the southeastern United States, there is a growing need to understand the ecological risk factors and distribution of the most abundant tick vector, *Amblyomma americanum*. While previous research has examined ecological factors influencing other tick vectors, such as *Ixodes scapularis*, few studies have evaluated micro-landscape variables associated with *A. americanum* abundance. Moreover, the spatial distribution of tick vectors is rarely studied at biologically relevant, fine-scale resolutions (i.e., < 100 m).

Methods: In this study, we applied a 5-m^2 sampling grid to a field site with diverse habitat structure to identify the micro-landscape variables associated with adult and nymphal abundance of *A. americanum* using linear modeling approaches. We also characterized the spatial distribution patterns of both life stages across our field site using hotspot analyses. Lastly, we applied the same hotspot analyses to ticks infected with *Ehrlichia* spp. and *Rickettsia amblyommatis*, two microbial agents associated with *A. americanum* in nature.

Results: We found that different landscape variables at field site influenced adult and nymphal abundance of *A. americanum*, with edge habitat emerging as a significant predictor for both life stages. While adults were broadly distributed across habitat types, nymphs were more spatially restricted to forested areas, aligning with previous observations of nymphal distribution patterns.

Conclusions: The significance of edge habitat and forest variables on *A. americanum* abundance highlights promising targets for control interventions and can be used to develop public health recommendations to reduce tick encounter risk and subsequent pathogen transmission.



Adams, D.R., Kays, R., and Reiskind, M.H.; *Parasites and Vectors* (2025); https://doi.org/10.1186/s13071-025-06999-2

Summary: Taking a fine-scale spatial approach, edge habitats and forest variables were found to significantly affect *A. americanum* abundance and can serve as targets for control interventions.

The Phenology of Ticks and Tick-Borne Pathogens in a University Green Zone in Georgia, USA

We determined the seasonal distribution and abundance of ticks on a nature preserve and adjacent walkways of a university campus and evaluated their Rickettsiales carriage. Ticks were collected weekly by flagging or dragging 17 sites from June 2022 through May 2024, and environmental parameters were recorded. Ticks were identified according to species, sex, and life stage using standard keys. DNA was extracted, and a *12S* tick mitochondrial DNA fragment was amplified and sequenced to verify tick identification. EvaGreen polymerase chain reaction (PCR) was used to test ticks for spotted fever group *Rickettsia* (SFGR) and Anaplasmataceae followed by amplification and sequencing of *omp*A and *gro*EL fragments to identify the respective organisms detected. Diversity of *Rickettsia* and *Ehrlichia* was examined by analyzing sites with variable numbers of tandem repeats. Seven hundred sixty-eight ticks were collected, including 257 *Amblyomma americanum* Linnaeus (19.5% female, 21.8% male, and 58.8% nymphs), 461 *Amblyomma* sp. larvae, 45 *Ixodes scapularis* Say, and 5 *Ixodes keiransi* Beati, Nava, Venzal, and Guglielmone. *Amblyomma americanum* was collected from March through October, and *I. scapularis* was found from November through March. SFGR DNA was detected in 36.5% of ticks (66 *A. americanum* and 7 *I. scapularis*) and 69.9% of larval pools. Only *Rickettsia amblyommatis* was identified in *Amblyomma* ticks; *I. scapularis* contained *Rickettsia buchneri*. Eight *Amblyomma* ticks that tested PCR positive for

Anaplasmataceae contained *Ehrlichia chaffeensis* (4 ticks), *Ehrlichia ewingii* (2), and Panola Mountain *Ehrlichia* sp. (2). Several variable-length PCR target (VLPT) variants of *E. chaffeensis* and plasmid gene tandem repeat variants of *R. amblyommatis* were detected in sympatric ticks collected from the study site. In conclusion, tick-borne rickettsiae found within small-scale green urban areas may pose risks of tick-borne infections for individuals using these places.

Eremeeva, M.E., Das, S., and Ogwara, C.; *The Journal of Parasitology* (2025); https://doi.org/10.1645/25-23

Summary: Ticks carrying tick-borne rickettsiae can be found in small-scale green urban areas, like college campuses, and thus people using these spaces may be at risk for infection.

National Section

IDPH Reminds Illinois Residents to Take Precautions Against Tick Bites

In this statement, the Illinois Department of Public Health announced its first identified case of Powassan in the state. Powassan is tickborne disease most often carried in the black-legged deer tick and that can cause severe neurological disease like encephalitis and meningitis.

Residents of Illinois are reminded to check themselves for ticks after spending time outside, reduce opportunities for exposure, wear preventive clothing, and take other precautions.

Illinois Department of Public Health (2025); https://dph.illinois.gov/resource-center/news/2025/september/release-20250922.html

Differences in Lyme Disease Diagnosis among Medicaid and Medicare Beneficiaries, United States, 2016-2021

Lyme disease is the most common vectorborne disease in the United States. Evidence suggests that persons from racial and ethnic minority groups experience more severe disease. We used a claims-based algorithm on data from 16 jurisdictions with high Lyme disease incidence to identify cases among 4 populations: Medicaid beneficiaries <18 and >19 years of age, and Medicare fee-for-service beneficiaries <65 and >65 years of age. We calculated the prevalence of disseminated disease, hospitalization, and other clinical and epidemiologic parameters by race and ethnicity. We found that non-White persons were more likely than White persons to be female, hospitalized at diagnosis, diagnosed outside of primary care, diagnosed outside of the peak months for Lyme disease transmission, and have disseminated disease. Those data illustrate differences in Lyme disease by race and ethnicity and suggest possible differences across other sociodemographic characteristics. Additional prevention methods are needed to reduce differences in Lyme disease recognition and severity.

Gould, L.H., et al.; *Emerging Infectious Diseases* (2025); https://doi.org/10.3201/eid3109.241653

Summary: There are differences in Lyme disease diagnoses across race and ethnic groups in the United States, based on healthcare claim data. The most pronounced difference was in children, particularly Black/African-American children, who had more than twice the prevalence of severe, disseminated disease than did White children. These differences could not be easily explained by differences in underlying health status.

Risk Factors for Lyme Disease in the General Population – A Survey of Adults and Caregivers in 28 States

Background: There are an estimated 476 000 diagnosed and treated cases of Lyme disease (LD) in the United States each year. The risk of infection depends on human contact with ticks infected with *Borrelia burgdorferi*, typically from outdoor activities in high-incidence areas. The population prevalence of the activities that confer risk is unknown.

Methods: We conducted online surveys of adults (ages 18+) and caregivers of children aged 1–17 in jurisdictions with a high incidence of LD, the states neighboring them, and selected counties in California and Oregon (CA/OR). The survey included questions on outdoor activities and occupation in forests, wooded areas, and areas with tall grass, residential characteristics, time spent in a yard, use of personal protection measures, history of LD and tick bites, and LD knowledge and risk perception. Data were weighted separately for each state-level sample and analyzed by region (ie, high incidence, neighboring, and CA/OR) and population (ie, adults and caregivers).

Results: A total of 44 330 adults and 28 380 caregivers completed the survey. Most respondents were aware of LD (range, 88–93%), spent time in a yard (adults, 88–92%; children, 96%–98%), or spent recreational time outside (adults, 70–79%; children, 83–84%). Always using prevention measures while doing outdoor recreational activities was reported for 34–40% of adults and 40–42% of children.

Conclusions: Despite the high population prevalence of LD awareness and of doing outdoor activities, less than half of surveyed respondents routinely used personal prevention measures to mitigate their risk of tick-borne diseases. More effective strategies and education are needed to prevent LD.

Gould, L.H., et al.; *Open Forum Infectious Diseases* (2025); https://doi.org/10.1093/ofid/ofaf658

Summary: Despite awareness of Lyme disease and its transmission, fewer than half of respondents reported routinely using personal prevention measures to reduce risk of acquiring tick-borne diseases.

Geographic trends in acarological risk reporting for *Ixodes scapularis* (Acari: Ixodidae)-borne infections across the eastern United States based on data submissions to the ArboNET Tick Module, 2004 to 2023

The United States Centers for Disease Control and Prevention introduced the National Tick Surveillance Program in 2018 to better define areas of acarologic risk in response to the increasing burden of blacklegged tick (*Ixodes scapularis,* Acari: Ixodidae)-associated infections. The program coordinates surveillance efforts conducted by state and local public health programs and collates acarological data in the ArboNET Tick Module national database. Among the metrics collected, the density of infected host-seeking nymphs (DIN) is believed to be most closely correlated with the reported occurrence of tick-borne diseases. Here, we assess the completeness and geographic representativeness of pathogen-specific DIN data collected from 2004 to 2023 and reported to the ArboNET Tick Module. We summarize county, state, and regional variation in the density of host-seeking *I. scapularis* nymphs infected with 6 human pathogens: *Borrelia burgdorfieri* sensu stricto (Spirochaetales: Spirochaetaceae), *Borrelia mayonii* (Spirochaetales: Spirochaetaceae), *Borrelia miyamotoi* (Spirochaetales: Spirochaetaceae), *Anaplasma phagocytophilum* (Rickettsiales: Anaplasmataceae), *Ehrlichia muris eauclairensis* (Rickettsiales: Ehrlichiaceae), and *Babesia microti* (Piroplasmida:Babesiidae). Although DIN data submissions have increased from the first to the second decade of surveillance in some regions (Northeast, Ohio Valley, Northern Rockies and Plains), they have decreased in other regions (South, Southeast). For a majority of counties across all regions, county DIN estimates were largely based on only a single annual DIN estimate per pathogen over the nearly 20 yr of surveillance. Despite the sparseness of DIN records in ArboNET, we show that acarological risk for Lyme disease has expanded geographically over the past 2 decades, and we present acarological risk maps for other *I. scapularis*-borne infections across the eastern United States.

Foster, E., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf098

Summary: Data submissions to ArboNET have varied by region and time period, but even from the occasionally sparse data, acarological risk for Lyme disease – based on the burden of blacklegged ticks – has increased over the last twenty years.

First finding of *Rickettsia rickettsii* in *Haemaphysalis longicornis* (Acari: Ixodidae) in North America

Rocky Mountain spotted fever (RMSF) is a tick-borne infection caused by *Rickettsia rickettsii* Brumpt, which is included in the spotted fever group (SFG) rickettsioses. In the United States, RMSF is transmitted primarily by ticks in the genus *Dermacentor* and in parts of Arizona and northern Mexico, by *Rhipicephalus sanguineus* Latreille. SFG rickettsiosis cases have been reported throughout the United States, but between 2018 and 2022, 5 states (Alabama, Arkansas, Missouri, North Carolina, and Tennessee) accounted for over 50% of SFG rickettsiosis cases. The most virulent of the spotted fever group rickettsia (SFGR), *R. rickettsii*, is potentially fatal if misdiagnosed or left untreated. Tick surveillance is one tool that public health

entomologists utilize in identifying potential hot spots of infected ticks. Although the prevalence of *R. rickettsii* in tick populations is generally low (~1% or less), the severity of this disease warrants frequent surveillance for the pathogen. With the inadvertent introduction of the longhorned tick into the United States, and its proven laboratory competence for transmitting *R. rickettsii*, the New Jersey Department of Health initiated surveillance of this tick for *R. rickettsii*. Here, we report the first finding of *R. rickettsii* in field-collected longhorned ticks, *Haemaphysalis longicornis* Neumann.

Soliman, M., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf131

Summary: Rocky Mountain spotted fever normally circulates in North America in *Dermacentor* and *Rhipicephalus sanguineus* ticks, but they have now been found for the first time in *Haemaphysalis longicornis* ticks too.

Unexpected Encounter with American Dog Ticks (*Dermacentor variabilis*) at an Urban Park in Freezing Air Temperature

We describe the collection of questing *Dermacentor variabilis* (American Dog Tick) outside its previously recorded seasonal active temperature range. In November 2023, we found 2 females host-seeking at an urban park in Louisville, KY, when the average air temperature was -1.0 °C. American Dog Ticks have a widespread distribution in North America and are typically active from March to September depending on location. Laboratory studies suggest they can survive temperatures as low as -15 °C, but before our collection, no active, host-seeking American Dog Tick had been reported below 0 °C in the field. As this species is a known vector for diseases of public health and economic concern, we encourage more research into its winter behavior and adaptations to cold tolerance.

Harmel, M., Middleton, M., and Pigg, R.M.; *Northeastern Naturalist* (2025); https://doi.org/10.1656/045.032.0311

Summary: *Dermacentor variabilis*, or the American dog tick, normally is not active in the winter or at winter temperatures outside of laboratory conditions. However, the authors here report finding females actively seeking hosts during the winter for the first time.

A systematic review of the associations between mosquito- and tick-borne diseases and vector research in the United States

Tick- and mosquito-borne diseases in the United States are occurring at increasing rates and are heterogeneously distributed among the states. The allocation of public health resources and the attention of a research community on ticks and mosquitoes should be proportional to the number of reported human disease cases in each state. We conducted a systematic literature review of all publications on field-based studies of mosquitoes and ticks as a proxy for resource availability and research attention and compared these to the number of human tick- and mosquito-borne disease cases. The results showed that although some states have proportional publications and human disease, many deviate. This study highlights many states that have low numbers of publications on ticks or mosquitoes yet high incidence of human disease and other

states that have high number of publications on ticks or mosquitoes yet a low disease incidence. This study may help public health agencies and the research community prioritize the need for increased research attention in states with the greatest disease burden.

Tian, Y., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf100

Summary: Many states do not have research publications levels proportional to their incidence of mosquito- and tick-borne disease, indicating a mismatch in research priorities.

Gray areas: an investigation of ectoparasite abundance and distribution and tick-borne pathogens in peridomestic eastern gray squirrels Rodentia: Sciuridae (*Sciurus carolinensis*)

The eastern gray squirrel (*Sciurus carolinensis* Gmelin) is a widely distributed rodent in North America, including introduced populations in western regions. Despite being widespread in urban and suburban ecosystems, their role as reservoirs for tick-borne pathogens has been understudied compared to other wildlife hosts. This study investigates the prevalence of ectoparasites and tick-borne pathogens in eastern gray squirrels across suburban habitats in Centre County, Pennsylvania, United States. Over 2 yr, squirrels were trapped across 5 sites and examined for ectoparasites. Ticks were the most common ectoparasites identified, followed by lice, fleas, and mites (in order of prevalence). *Ixodes scapularis* Say was the only tick species identified. The head, particularly the ears, was the most frequently infested body region. In addition to ectoparasite surveillance, we assessed the presence of tick-borne pathogens in squirrels and pathogens in ticks. Squirrels were RNA-positive for *Borrelia burgdorferi* ([Johnson, Schmid, Hyde, Steigerwalt & Brenner])*, Anaplasma phagocytophilum* (Foggie, 1949), *Borrelia miyamotoi* (Franca, 1910) Fukunaga, *Babesia microti*, and *Rickettsia rickettsii* (Wolbach, 1919). ELISA screened 61 serum samples collected from individual squirrels for antibodies to the *Borrelia burgdorferi* VlsE and *Anaplasma* P44 proteins. Sixty-two and 17% were positive for antibodies to VlsE and P44, respectively, indicating past or current infection. The data presented collectively contribute to our better understanding of pathogen exposure in eastern gray squirrels. The results highlight the potential role of the eastern gray squirrel in vector ecology and the epidemiology of tick-borne diseases. Enhanced surveillance efforts in peridomestic areas are warranted and may mitigate zoonotic risks to humans and domestic animals.

Roberts, C.E., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf125

Summary: The eastern gray squirrel, which is widely distributed in North America, can carry many ectoparasites, including ones that host tick-borne pathogens of concern.

Tickborne microorganisms in *Dermacentor andersoni* (Acari: Ixodidae) in the Bitterroot Mountains of Western Montana

The Rocky Mountain wood tick, *Dermacentor andersoni* Stiles, is the most common human biting tick in the Rocky Mountain region of the USA. Although *Rickettsia* spp. and Colorado tick fever virus have been studied in *D. andersoni* in certain areas of their distribution, investigations of most other tickborne pathogens are lacking. Despite the history of Rocky Mountain spotted fever in the Bitterroot Mountains of western Montana, no comprehensive surveys of large numbers of ticks for *Rickettsia* spp. have been conducted there for >40 years. For the present study, host-seeking adult *D. andersoni* were collected at multiple sites in canyons on the west side of the Bitterroot Valley in western Montana in spring 2021. Following DNA extraction, ticks were screened by polymerase chain reaction assays for several tick-borne microorganisms. DNA sequence data analysis was conducted to confirm identity and conduct phylogenetic comparisons with reference strain sequences of different organisms. No ticks were found to contain *Anaplasma* spp., *Borrelia* spp., or *Ehrlichia* spp. DNA, and a *Babesia* sp. was detected in only one tick. However, *Bartonella* spp. DNA was detected in 2 % of tested ticks. Additionally, five species of *Rickettsia*, including *R. peacockii, R. bellii, R. rhipicephali, R. montanensis*, and *R. rickettsii,* were identified in ticks from different sites. The most prevalent *Rickettsia* species was *R. peacockii* and the least common was *R. rickettsii* (found in only two ticks). The relevance of these findings is discussed in relation to historical and contemporary data on *Bartonella* spp. and *Rickettsia* spp.

Clark, K.L., et al.; *Ticks and Tick-Borne Diseases* (2025); https://doi.org/10.1016/j.ttbdis.2025.102555

Summary: This is the first comprehensive study of *Dermacentor andersoni* and the tick-borne diseases it carries in the Bitterroot Mountains of Western Montana in over 40 years.

Assessing the potential risk of lone star tick, *Amblyomma americanum*, establishment in California

The lone star tick (LST), Amblyomma americanum, is an aggressive human biter and important vector of the causative agents of tick-borne diseases. As geographic ranges of multiple Amblyomma species rapidly expand due to habitat changes and human and other animal movement patterns, there are concerns for establishment of LST in US states with suitable climates, such as California, especially given a dearth in gaps in tick surveillance. Importantly, previous niche modeling confirmed habitat in California along the length of the coast and coast range mountains. We sought data on LSTs and LST risk from 30 different entities including companies that identify and test ticks, natural history and entomology museums and collections, experts, and large databases. These queries and published records yielded records of 76 LSTs from California as well as two Amblyomma cajennense sensu lato, one Amblyomma sabanerae, one Amblyomma maculatum, and five Amblyomma dissimile. Among LSTs, there were 18 adult females, ten males, 13 adults for which sex was not recorded, 22 nymphs, two larvae, and 11 with no stage data. LSTs were recorded only during late spring through late summer, with all three feeding stages superimposed temporally. Active surveillance was

conducted at nine sites considered high-risk due to earlier records of LSTs or high probability of establishment on niche modeling, using tick flagging, monitoring ovine and cervid hosts, and circulating a flier; no LSTs were recovered in this activity. We assessed risk for establishment of LSTs in California using invasion theory, prior niche modeling, literature review of ecological constraints on LSTs within their current range, data acquired in retrospective and prospective segments of this study, and expert consultation. Elevated risk is expected particularly along coastal California. Although some of these ticks likely were transported from out of state endemic regions, the findings of 76 LSTs, including all three feeding stages, in multiple counties raises concern that establishment in the future could occur in California.

Foley, J., et al.; *Ticks and Tick-Borne Diseases* (2025); https://doi.org/10.1016/j.ttbdis.2025.102566

Summary: *Amblyomma americanum* is not yet established in California, but California has a suitable climate for it. This study found all life stages of *A. americanum* in multiple counties of California, raising concerns for establishment.

Patterns of demographic and behavioral factors associated with tick encounters in Maine (USA) using passive surveillance data

While ecological factors drive tick abundance and pathogen prevalence, human behaviors and demographics can interact with these ecological drivers to shape tick encounter risk. We analyzed 7848 tick submissions and associated survey responses from Maine residents collected from January 2020 through December 2022 via a passive tick surveillance program. We examined the spatial and demographic differences in the use of tick prevention strategies among individuals who submitted tick specimens. We investigated differences in tick encounter frequency across reported property types and human activities and differences in tick attachment sites on the body, based upon human age and tick life stage. We found that personal protection measures were used prior to only 15 % of reported tick encounters, with higher usage reported for ticks found on adults than children and by individuals engaged in high-perceived-risk activities including camping, hunting, hiking, and agricultural work. We also detected spatial differences, with residents of southern regions that generally have higher acarological risk employing preventive measures more frequently than those in northern regions. Tick encounters were commonly reported at participants' residences, often during yardwork/gardening and outdoor play. We noted age-related patterns in bite frequency and attachment sites, with children more frequently bitten on the head and neck and adults on the legs and torso. Across all age classes, immature ticks tended to attach lower on the body. By identifying high-risk areas, vulnerable age groups, predominant tick attachment sites, and gaps in protective practices, our findings can inform the development and implementation of targeted tick protection interventions.

Fill, G.M., et al.; *Ticks and Tick-Borne Diseases* (2025); https://doi.org/10.1016/j.ttbdis.2025.102573

Summary: This study identified factors associated with risk of tick encounters in Maine, like use of personal protection measures, age, activities, and spatial differences.

International Section

The dependence of urban tick and Lyme disease hazards on the hinterlands

Within- and between-city contexts and interactions shape our experiences of city life. However, a gap in understanding is how the wider landscape context of cities and the interactions with hinterlands influence urban ecology and health hazards. Using a meta-ecosystem framework, we fill this gap for the tick-borne Lyme disease ecological system by comparing the tick and Lyme disease hazards of urban and hinterland sites for 16 UK cities. We discover that the environmental hazards of ticks and Lyme disease of urban greenspaces are two- and threefold lower, respectively, than those of hinterland woodlands. Crucially, urban tick and Lyme disease hazards are shaped by tick abundance and the landcover (woodland and built-up) of hinterlands, but not of cities themselves. This highlights how rural–urban interactions form meta-ecosystems, and urban eco-epidemiology can depend on the characteristics of the surrounding rural landscape. Therefore, to better understand urban ecological processes and to mitigate disease risk in cities, it may be necessary to consider environmental factors in the hinterland such as landcover and disease hazard outside cities.

Gandy, S.L., et al.; *nature cities* (2025); https://doi.org/10.1038/s44284-025-00320-z

Summary: Urban areas and the green spaces around them can be viewed as distinct but coupled systems, and differences in these green spaces – referred to as “hinterlands” – drive variation in tick and Lyme disease hazards between cities in England.

Fatal Tick-Borne Encephalitis in Unvaccinated Traveler from the United States to Switzerland, 2022

We report an unvaccinated traveler from the United States who contracted fulminant fatal tick-borne encephalitis while visiting Switzerland. Climate changes and international travel are intensifying tick exposure for unvaccinated persons. The increasing incidence of tick-borne encephalitis across Europe underscores the importance of tick bite prevention and vaccination against tick-borne encephalitis virus.

Scotti, C., et al.; *Emerging Infectious Diseases* (2025); https://doi.org/10.3201/eid3111.251320

Summary: A United States traveler vacationing in Switzerland died after contracting tick-borne encephalitis, likely while hiking in forested areas in the country. There is need to emphasize personal protective measures and vaccination in endemic regions.

Neoehrlichia mikurensis in Ticks and Tick-Bitten Persons, Sweden and Finland, 2008-2009

By using PCR testing, we found *Neoehrlichia mikurensis* DNA in 1.1% of ticks removed from persons in Sweden and Finland. Symptoms developed in 2 immunocompetent persons. Despite low transmission risk, infection can occur after short tick attachment. Our findings highlight the need to consider *N. mikurensis* in patients with unexplained symptoms after tick bite.

Hero, E., et al.; *Emerging Infectious Diseases* (2025); https://doi.org/10.3201/eid3111.241850

Summary: *N. mikurensis* was not recognized as a pathogen back in 2008-2009, so this study went back to assess whether it was around at the time despite it not being recognized.

Molecular Section

Co-feeding transmission of Heartland virus between the North American tick, *Amblyomma americanum* (Acari: Ixodidae), and the invasive East Asian tick, *Haemaphysalis longicornis* (Acari: Ixodidae)

Haemaphysalis longicornis Neumann is an invasive tick species from East Asia with a rapidly expanding geographic range in the United States. In a laboratory setting, *H. longicornis* has been shown to support transovarial transmission of Heartland virus (HRTV; genus *Bandavirus*), an emerging tick-borne pathogen responsible for human disease in the southern and midwestern United States. The native *Amblyomma americanum* (L.) is the primary known vector of HRTV, and field surveillance studies have documented co-feeding of *H. longicornis* and *A. americanum* on shared hosts, raising questions about the potential for interspecies viral transmission. To investigate whether *H. longicornis* can acquire HRTV through co-feeding with infected *A. americanum*, we used a mouse model in which HRTV-infected A. americanum nymphs were co-fed with uninfected *H. longicornis* larvae or nymphs and screened recipient ticks using q-RT-PCR. HRTV RNA was detected in *H. longicornis* collected from multiple mice, demonstrating interspecies co-feeding transmission of HRTV. Mouse blood samples were consistently negative for HRTV RNA, while some skin biopsies from tick feeding sites were positive for the virus, indicating nonviremic co-feeding transmission. These findings provide the first experimental evidence that H. longicornis can acquire HRTV RNA through co-feeding with *A. americanum* and could contribute to its maintenance in nature, even in the absence of a known vertebrate reservoir host for HRTV.

Norman, P.D., et al.; *Journal of Medical Entomology* (2025); https://doi.org/10.1093/jme/tjaf110

Summary: Heartland virus is capable of passing from *A. americanum* to *H. longicornis* through co-feeding in a laboratory setting, which may contribute to its maintenance in nature even without a known vertebrate host for the virus.

Isolation and Characterization of *Rickettsia finnyi*, Novel Pathogenic Spotted Fever Group *Rickettsia* in Dogs, United States

In 2020, a novel spotted fever group Rickettsia was described in 3 clinically ill dogs in the United States. Using naturally infected canine blood, the novel Rickettsia sp. was isolated in epithelial (Vero E6) and mononuclear (DH82 and 030D) cell lines. The sequenced whole genome revealed a 1.27 Mb circular chromosome with 96.87% identity to Rickettsia raoultii on the basis of average nucleotide identity analysis. A maximum-likelihood phylogeny tree placed the novel Rickettsia in its own branch within the spotted fever group. Immunofluorescence revealed single rods localized along the membrane in epithelial cells and randomly distributed in the cytoplasm of mononuclear cells. We propose the name Rickettsia finnyi sp. nov., strain 2024-CO-Wats, which is available from national and international Rickettsial isolate reference collections. Fever and thrombocytopenia were among abnormalities in the 17 naturally infected dogs we describe, underscoring the pathogenic importance of R. finnyi sp. nov. and its potential public health relevance.

Korla, P.K., et al.; *Emerging Infectious Diseases* (2025); https://doi.org/10.3201/eid3111.250681

Summary: A new *Rickettsia* species was discovered in dogs in the United States. Here, the authors characterize its genome and phylogeny.

Molnupiravir inhibits Bourbon virus infection and disease-associated pathology in mice

Bourbon virus (BRBV) is an emerging tick-borne virus that can cause severe and fatal disease in humans. BRBV is vectored via the *Amblyomma americanum* tick, which is widely distributed throughout the central, eastern, and southern United States. Serosurveillance studies in Missouri and North Carolina identified BRBV-neutralizing antibodies in approximately 0.6% of tested individuals. To date, no specific antiviral therapy exists. As part of an initial screen, several nucleoside analogs were tested for their ability to inhibit BRBV replication in cell culture. Among the compounds assessed, molnupiravir, an antiviral drug with oral availability and broad spectrum antiviral activity against RNA viruses, showed antiviral activity against BRBV production *in vitro. In vivo*, pre-exposure administration of molnupiravir protected susceptible type I interferon receptor knockout (*Ifnar1*$^{-/-}$) mice against lethal BRBV infection. The protection by molnupiravir was associated with lower virus burden in mouse tissues, improvement of T-cell ($CD4^+$, $CD8^+$) and B-cell (follicular) profiles in the spleen, improvement of severe thrombocytopenia, and reduced pathology in the spleen and liver of BRBV-infected mice. Finally, therapeutic administration of molnupiravir starting 24 or 48 hours after infection ameliorated weight loss, clinical signs of disease, and lethality associated with BRBV infection. Overall, our experiments suggest that molnupiravir is a potential antiviral therapy for evaluation in humans with BRBV infections.

Bamunuarachchi, G., et al.; *Journal of Virology* (2025); https://doi.org/10.1128/jvi.00740-25

Summary: Antiviral drug molnupiravir works well at lowering Bourbon virus burden in mice and reducing symptoms.

Alpha-Gal Section

New Jersey man's death first one to be tied to tick-related meat allergy

This news article from CIDRAP discusses the first known death related to alpha-gal syndrome in the United States. The 47 year-old New Jersey man's death after eating a hamburger at a barbeque was ruled a "sudden unexplained death" but post-mortem sampling and analyses done by Dr. Thomas Platts-Mills – the doctor who first identified alpha-gal syndrome in 2007 and is considered the foremost expert – found that the man was sensitized to alpha-gal, and had had an extreme reaction in line with what is often seen in fatal anaphylaxis.

The death and postmortem findings were published with the family's permission as a case study (Platts-Mills, T.A.E., et al.; *The Journal of Allergy and Clinical Immunology In Practice* (2025); https://doi.org/10.1016/j.jaip.2025.09.039).

Soucheray, S.; CIDRAP (2025); https://www.cidrap.umn.edu/tick-borne-disease/new-jersey-mans-death-first-one-be-tied-tick-related-meat-allergy

Childhood-onset alpha-gal syndrome in the central Black Sea region: real-world data on diagnostic delays, age-specific clinical patterns, environmental risk factors, and anaphylaxis predictors

Alpha-gal syndrome (AGS) remains underdiagnosed in the pediatric population despite increasing awareness. This study comprehensively evaluates diagnostic delays, age-specific clinical presentations, environmental risk factors, and novel biomarkers for anaphylaxis prediction in childhood-onset AGS. This study examined 39 childhood-onset AGS cases diagnosed at the Ondokuz Mayıs University Pediatric Allergy and Immunology Clinic, with symptom onset at 18 years of age or younger. Patients underwent comprehensive clinical evaluation including alpha-gal specific IgE testing (≥ 0.35 kU/L), skin prick tests, and oral food challenge tests when deemed necessary. Diagnostic delay was defined as the time interval between symptom onset and definitive diagnosis. Clinical phenotypes, environmental exposures, laboratory parameters, and vitamin D levels were systematically evaluated. Among 39 patients (69.2% male), the median age of symptom onset was 7 years (range: 1–18), with a median diagnostic delay of 2 years (range: 0–35). Diagnostic delay exceeded 2 years in 43.6% of patients, with 12.8% experiencing extreme delay (> 10 years). Anaphylaxis occurred in 76.9% of patients and was predominantly early-onset (≤ 6 h: 61.5%). Tick bite history was present in 84.6% of patients, hazelnut orchard exposure in 69.2%, and family history of meat allergy in 53.8%. Alpha-gal IgE levels were significantly higher in males (10.10 ± 8.39 vs. 5.31 ± 2.70 ng/mL, $p < 0.05$) and patients with anaphylaxis (9.42 ± 8.04 vs. 5.99 ± 2.96 ng/mL, $p = 0.048$). Our novel findings revealed significantly lower vitamin D levels in anaphylactic patients (15.58 vs. 20.31 ng/mL, $p = 0.049$). Fresh meat prick tests demonstrated superior sensitivity (100%) compared to commercial extracts (51.3%). Patients without concurrent allergic disease showed significantly higher rates of diagnostic delay (52.9% vs. 13.6%, $p = 0.008$).

Karadağ, S.İ.K., et al.; *European Journal of Pediatrics* (2025); https://doi.org/10.1007/s00431-025-06674-9

Summary: The authors here provide one of the most comprehensive cohorts looking at childhood-onset alpha-gal syndrome, and is the first case series from the Central Black Sea Region, where tick exposure is prevalent.

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Tick-Borne Infections Council of North Carolina is a non-profit 501(c)3 organization formed to improve the recognition, treatment, control, and understanding of tick-borne diseases in North Carolina. We are all-volunteer and appreciate donations.

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