



Tick-Borne Infections Council
of North Carolina, Inc.

2014 NEWSLETTER, Volume 2



Quote of the Season: From Dr. Margaret Chan, WHO Director-General: *“A global health agenda that gives higher priority to vector control could save many lives and avert much suffering. . . No one in the 21st century should die from the bite of a mosquito, a sandfly, a black fly or a tick.”*

Highlights...

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State Vector-Borne Disease Task Force Meeting Schedule

The 2015 meeting schedule has not yet been determined

Links to Letters to Medical Providers from the State Department of Public Health on Lyme Disease and Rickettsial Diseases

These links are to the letters the state Department of Public Health issues every year to medical providers on Lyme disease and the Rickettsial diseases such as RMSF:

[2014 Rickettsial Disease Memo](#)

[2014 Lyme Disease Memo](#)

North Carolina Data on Reportable Tick-borne Infections

Disease	Total cases by year of report 2012 Final	Total cases by year of report 2013 Preliminary	Cases between 1/1/14 and 6/30/14
	Confirmed + Probable (Confirmed/Probable/Suspected)	Confirmed + Probable (Confirmed/Probable/Suspected) *	(Probable + Confirmed)**
Lyme disease	123 (27/96/80)	180 (39/141/89)	143 / 7 confirmed
Rickettsioses	591 (12/579/341)	426 (11/415/193)	153 / 1 confirmed
Ehrlichia	105 (18/91/56)	78 (24/54/22)	19 / 4 confirmed
Anaplasma	21 (0/21/21)	15 (1/14/14)	4 / 0 confirmed

*This is the year of report, not year of illness onset

** Illness onset may be prior to 1/1/14

Note: Alleghany County now has a second confirmed case of Lyme disease in a person who had not traveled out of the county for 30 days after their tick exposure. **Therefore, Alleghany County is now considered endemic for Lyme disease bringing the total of endemic counties in NC to four (Wake, Guilford, Haywood, Alleghany).**

Counties with one case of locally acquired Lyme disease: Cleveland (2008), Wilkes (2009), Wilson (2009), Pitt (2009), Carteret (2009), Gates (2011), Perquimans (2011), Rowan (2013), Union (2013), Caldwell (2013), Franklin (2014), Stanley (2014).

How is a County Endemic for Lyme Disease Defined?

CDC definition: States determine which counties are endemic for Lyme disease--not the CDC. Furthermore, not all states use the same criteria for determining endemic counties. The Council of State and Territorial Epidemiologists (CSTE) considers a county to be endemic for Lyme disease if:

- There are at least two confirmed human cases that were acquired in (not just reported from) that county, or*

- There are established populations of *Ixodes scapularis* or *Ixodes pacificus* are infected with *B. burgdorferi*
 Accessed January 31, 2014. <http://www.cdc.gov/lyme/faq/>

*NC uses only this criteria.

New Study: Proportions of Veterinarians in NC That Believe Lyme Disease is Endemic by Region

Survey of veterinarians' perceptions of borreliosis (Lyme disease) in North Carolina

Objective—To evaluate the practices and perceptions of veterinarians in North Carolina regarding borreliosis in dogs in various geographic regions of the state.

Design—Cross-sectional survey.

Sample—Data from 208 completed surveys.

Procedures—Surveys were distributed to veterinary clinics throughout North Carolina. Descriptive statistics were used to summarize perceptions pertaining to borreliosis among dogs in North Carolina.

Results—A significantly higher proportion of responding veterinarians believed that borreliosis was endemic in the coastal (67.2%) and Piedmont (60.9%) areas of North Carolina, compared with more western regions (37.5%). The 3 variables found to be significantly different between the northern and southern regions of the state were the estimated number of borreliosis cases diagnosed by each responding veterinary clinic during the past year, the perception of borreliosis endemicity, and the perceptions related to the likelihood of a dog acquiring borreliosis in the state.

Conclusions and Clinical Relevance—Veterinarians' perception of the risk of borreliosis in North Carolina was consistent with recent scientific reports pertaining to geographic expansion of borreliosis in the state. As knowledge of the epidemiological features of borreliosis in North Carolina continues to evolve, veterinarians should promote routine screening of dogs for *Borrelia burgdorferi* exposure as a simple, inexpensive form of surveillance that can be used to better educate their clients on the threat of transmission of borreliosis in this transitional geographic region.

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Journal of the American Veterinary Medical Association March 1, 2014, Vol. 244, No. 5, Pages 592-596

doi: 10.2460/javma.244.5.592

TIC-NC's addendum to abstract:

Surveys were sent to 512 clinics and 208 from 64 counties throughout the state responded. The estimated number of cases of canine borreliosis diagnosed during the past year varied greatly by clinic. 49.5% reported one to five cases, 22.6% reported 6 to 26 cases, 5.3% reported 26 to 50 cases, and 1.9% reported greater than 50 cases.

By region in North Carolina:

Northern clinics 35.8% reported \geq to six cases

Southern clinics 15.8% reported \geq to six cases

~ 20% of clinics in both areas reported no cases. Dogs were apparently tested with the SNAP 3DX/SNAP 4DX tests from IDEXX Laboratories Inc., Westbrook, Maine

Diane Rehm Show on Lyme Disease, March 18, 2014

Show: Update on Diagnosing and Treating Lyme Disease

The Centers for Disease Control and Prevention estimates that about 300,000 Americans are diagnosed with Lyme disease each year. An update on the challenges of diagnosing and treating Lyme Disease. Link to listen:

<http://thedianerehmshow.org/shows/2014-03-18/update-diagnosing-and-treating-lyme-disease>

Transcript link:

<http://thedianerehmshow.org/shows/2014-03-18/update-diagnosing-and-treating-lyme-disease/transcript>

Note: Some of the information from speakers on the show was incorrect.

Six Babesia Species Found in Lone Star Ticks and Dog Ticks in Tennessee and Georgia

NC was not in the study but GA and TN were. *Babesia* positive ticks were *A americanum*, *D variabilis*, and one *I scapularis*. *Babesia*, a malaria-like tick-vectored parasite has previously not been thought to be in the south. Studies need to be done to see if the lone star tick and dog tick can transmit the parasite.

Diversity of Piroplasms Detected in Blood-Fed and Questing Ticks From Several States in the United States

Piroplasms in the genera *Babesia*, *Theileria*, and *Cytauxzoon* are tick-borne parasites that may be animal and human pathogens. Most piroplasms with known life cycles are transmitted by ixodid ticks; however, for many species, the vector is unknown. This study was conducted to determine the prevalence and diversity of piroplasms in ticks from several US states. Piroplasm-specific polymerase chain reaction (PCR) assays were used to test 1631 ticks from Georgia (n=486), Kentucky (n=103), Pennsylvania (n=1), Tennessee (n=626), and Texas (n=414). Ticks were either questing (n=42) or collected from animals (n=627) or humans (n=962). The 2 primary species tested were *Dermacentor variabilis* (n=702) and *Amblyomma americanum* (n=743), but *Amblyomma cajennense* (n=99), *Amblyomma maculatum* (n=16), *Ixodes scapularis* (n=4), *I. woodi* (n=1), and unidentified *Amblyomma* spp. nymphs (n=64) were also tested. A low prevalence of piroplasms was detected with 37 (2.3%), 35 (2.1%), and 9 (0.6%) ticks positive for *Theileria* spp., *Babesia* spp., or *Cytauxzoon felis*, respectively. Based on sequence analysis, at least 6 *Babesia* spp. were detected and 15 of the 35 (41%) *Babesia*-positive ticks were *A. americanum*, 19 (56%) were *D. variabilis*, and one (3%) was an *I. scapularis*. Nine *Babesia*-positive ticks were removed from humans from Kentucky (n=1), Georgia (n=2), Texas (n=5), and Pennsylvania (n=1). Three *Babesia*-positive ticks were questing *A. americanum* which represents the first report of *Babesia*-infected questing *Amblyomma* in the US.

Places where the TIC-NC brochure has been distributed Spring 2014:

Graham:

Alamance County Children's Museum
Graham Public Library
Historical Museum

Hillsborough:

Weaver Street Market
Orange County Main Library

Pittsboro:

Grand Tree Walk participants
Chatham Library

Other:

UNC Health Expo
Caswell County's Annual Health Fair
Country store in Chatham
Various sites in Hillsborough
School flyer: Middle school in Raleigh via e-newsletter

Theileria infections were only detected in *A. americanum*, and all sequences were similar to white-tailed deer associated *Theileria* spp. *C. felis* was only detected in *D. variabilis*. These data suggest that *A. americanum* may be a vector of *Babesia* spp., although experimental studies are needed to confirm vector competence. Finally, these data demonstrate a high diversity of piroplasms in both questing and partially fed ticks in the US; although, host-blood meals can be present in non-questing ticks.
Shock BC, et al. Ticks Tick Borne Dis. 2014 Apr 4. pii: S1877-959X(14)00037-5. doi: 10.1016/j.ttbdis.2014.01.003

Study of Effectiveness of the ‘Insect Shield’ Cloth Treatment for Preventing Tick Bites

Long-lasting Permethrin Impregnated Uniforms: A Randomized-Controlled Trial for Tick Bite Prevention

Because of frequent exposure to tick habitats, outdoor workers are at high risk for tick-borne diseases. Adherence to National Institute for Occupational Safety and Health–recommended tick bite prevention methods is poor. A factory-based method for permethrin impregnation of clothing that provides long-lasting insecticidal and repellent activity is commercially available, and studies are needed to assess the long-term effectiveness of this clothing under field conditions. A double-blind RCT was conducted between March 2011 and September 2012. Subjects included outdoor workers from North Carolina State Divisions of Forestry, Parks and Recreation, and Wildlife who worked in eastern or central North Carolina. A total of 159 volunteer subjects were randomized, and 127 and 101 subjects completed the first and second years of follow-up, respectively. Uniforms of participants in the treatment group were factory-impregnated with long-lasting permethrin whereas control group uniforms received a sham treatment. Participants continued to engage in their usual tick bite prevention activities.

Results. Study subjects reported 1,045 work-related tick bites over 5,251 person-weeks of follow-up. The effectiveness of long-lasting permethrin impregnated uniforms for the prevention of work-related tick bites was 0.82 (95% CI=0.66, 0.91) and 0.34 (95% CI=–0.67, 0.74) for the first and second years of follow-up. These results indicate that long-lasting permethrin impregnated uniforms are highly effective for at least 1 year in deterring tick bites in the context of typical tick bite prevention measures employed by outdoor workers.

Vaughn M, et al. Am J Prev Med. 2014 May;46(5):473-80. doi: 10.1016/j.amepre.2014.01.008.

New from the CDC

The CDC has given www.cdc.gov/ticks a bit of a facelift and added additional diseases to the Tickborne Diseases of the U.S. page (<http://www.cdc.gov/ticks/diseases/>) and the Tickborne Diseases Abroad page (<http://www.cdc.gov/ticks/diseases/abroad.html>). Summer camp prevention materials include a generic tick bite prevention comic modeled after the original Lyme prevention comic: · Lyme version: http://www.cdc.gov/lyme/resources/toolkit/DontletTicksbitemeComicFS_508.pdf
Generic tick version: http://www.cdc.gov/ticks/resources/DontletTicksbitemeComicGenericFS_508.pdf

Tick Test for Persistent Lyme Disease Tried in Humans

Adapted from Reuters Health - A small experiment to see whether uninfected ticks could "diagnose" a lingering Lyme infection in people produced modest results, researchers say. DNA from the Lyme

parasite, but not live parasites themselves, were transmitted to the ticks from just two people out of two dozen who had persistent Lyme symptoms despite treatment.

In animal studies, researchers have successfully used "xenodiagnosis," or diagnosis with another animal, to detect the signs of a persistent Lyme infection in the blood. The technique has also worked in people to detect another parasitic infection, Chagas disease.

For the new study, researchers tried out the second-bite system on 36 people who had had standard treatment for Lyme disease--26 had either persistent symptoms after treatment, or still had an itchy, red lesion at the site of the original bite, or had unusually high levels of antibodies against the infection even though treatment seemed to have been successful. The other ten volunteers were healthy and had never had Lyme disease.

Researchers placed 25 to 30 uninfected ticks on the arm of each person to feed, under a special dressing, and collected the ticks a few days later. The ticks were then incubated for up to two weeks to allow any potentially transmitted Lyme bacteria to develop, and afterwards researchers did a variety of molecular tests looking for any signs of the bacteria.

None of the ticks from healthy volunteers had evidence of the Lyme bacteria. Researchers successfully harvested usable ticks from 23 participants with a history of Lyme, and 21 had no ticks test positive for signs of bacteria. For another two people the results were unclear. For one person with persistent symptoms after antibiotic treatment and one person with a persistent rash who had just started antibiotics, the ticks did test positive for fragments of DNA from the bacterium.

The main objective of the study was to see if this type of xenodiagnosis is safe and appropriate for humans, and the answer seems to be yes since the major complaint from subjects was mild itching, said Justin D. Radolf of the University of Connecticut Health Center in Farmington.

It's hard to say how useful this technique actually is in humans for Lyme disease, Bockenstedt and Radolf write in the journal. The only way to diagnose a persistent infection is by finding live bacteria, which this test did not.

Marques, A. et al. Xenodiagnosis to detect Borrelia burgdorferi infection: A first-in-human study. Clin Infect Dis. first published online February 11, 2014

doi:10.1093/cid/cit939. <http://cid.oxfordjournals.org/content/early/2014/02/10/cid.cit939.abstract>

News release excerpted here by Kathryn Doyly, NY Feb 28, 2014

Enhanced Availability of Data for Nationally Notifiable Diseases Including Several Tick-Borne Diseases

January 17, 2014 / 63(02);44 MMWR. Provisional data for cases of selected diseases and conditions reported through the National Notifiable Diseases Surveillance System (NNDSS) by the 50 states, New York City, the District of Columbia, and U.S. territories are collated and published weekly in *MMWR*. Beginning with the January 10, 2014, issue, these data are now available at <https://data.cdc.gov> in various sortable, machine-readable formats that will make them more usable for analyses. Each weekly issue of *MMWR* includes a link that takes users to that week's dataset, from which they can link to the new formats.

For entire article see:

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6302a6.htm?s_cid=mm6302a6_w

GALDA (GeorgiaLymeDisease.org) May Billboard Campaign and Governor's Proclamation- "Lyme and Tick-Borne Disease Awareness Month."



Georgia's ads ran in several locations on major highways and side streets around metro Atlanta from April 28 - June 1. Last year, potential reach was over 1 million people in one week alone. In addition, this year electronic ads will run in Atlanta's MARTA rail system. Millions of people saw these ads. This year, for the first time, Lyme disease proclamations were issued in Georgia, Florida, Kentucky, Tennessee, and North Carolina.

Tick Poo May Attract Lone Star Ticks into an Area

Expanding Distribution into the Midwest by the Lone Star Tick is Facilitated by Recognizing Excreta of Previously Established Ticks

Leighanne Main, et al. Wittenberg University Poster presentation

The southeastern lone star tick, *Amblyomma americanum*, has recently appeared in our field sweeps. This new tick in our area brings the potential for diseases, such as ehrlichiosis, tularemia, and Southern rash illness borreliosis. Favorable habitats are indicated by excreta of ticks that are already established, with the excreta acting as an assembly pheromone that retains ticks in areas with proper temperature, moisture, and suitable hosts. Our hypothesis is that excreta from different tick species may function as an assembly pheromone for lone star ticks, which may have contributed toward lone star ticks establishing here. Clustering responses by lone star ticks on excreta of ticks from different tick species was tested using six-sector Petri dish attraction bioassays with an added relative humidity component. Dry 33% RH conditions elicited greater clustering (higher speed, more ticks involved) than under humid 93% RH, mostly by female adults and nymphs and only a few larvae. Greatest response was to excreta of black-legged tick *Ixodes scapularis*.



Other excreta that was attractive and resulted in clustering, but less intense, was Gulf Coast tick *A. maculatum*, American dog tick *Dermacentor variabilis*, and brown dog tick *Rhipicephalus sanguineus*. The conclusion is that lone star ticks can recognize assembly pheromone of other ticks, migration probably occurs by adults during dry weather, and arrival of the Lyme disease vector *I. scapularis* seems likely.

<http://digitalcommons.butler.edu/urc/2014/biology/>

Increased Effort to Combat Lyme Disease in 2014 Omnibus

Washington, D.C. (January 27, 2014) – Efforts to combat Lyme disease get a much-needed boost in the FY 2014 Omnibus spending bill recently signed into law, according to Rep. Frank Wolf, one the leading champions to find a cure to the debilitating disease.

In addition to providing \$9 million to Centers for Disease Control (CDC) to help to combat Lyme, the bill directs the CDC to develop better diagnostic testing and national surveillance systems. The measure also directs the National Institute of Sciences to continue its efforts to more accurately assess the presence of acute and chronic Lyme disease and encourages the National Science Foundation to continue to support Lyme research efforts.

The four research agencies within the Department of Agriculture are also directed to build on ways to protect humans and livestock from tick-borne illnesses and to consider how such diseases impact the local economy.

The increased effort comes in the wake of recent news reports that suggest Lyme disease affects nearly 300,000 people each year, up to 10 times more than previously thought.

People in City Parks are at Risk of Tick-borne Infections

Rickettsiae and Ehrlichiae Within a City Park: Is the Urban Dweller at Risk? Tick-borne diseases, such as spotted fever rickettsioses and ehrlichioses, are potentially severe and life-threatening infections. The incidences of these infections increase during warm weather months as ticks become active. Clinicians often consider outdoor activities in rural areas to be a risk factor for exposure to ticks and the pathogens they carry, but are those who live, work, and play within an urban environment excluded from this risk? In this study, ticks were collected from two urban parks in Little Rock, AR, to assess the presence of rickettsiae and ehrlichiae within an urban setting. A total of 273 ticks were collected during July, 2011. *Amblyomma americanum* was the predominant tick species, with 255 (93%) of those collected. The remaining 18 (7%) were *Dermacentor variabilis*. Ticks were separated and pooled into groups for further testing. Forty-two of the 43 (98%) *A. americanum* pools demonstrated molecular evidence for the presence of rickettsiae. None of the *D. variabilis* contained rickettsiae. Restriction enzyme fragment length polymorphism analysis and DNA sequencing revealed *Rickettsia amblyommii* to be the species present. One *A. americanum* pool from park A demonstrated the presence of *Ehrlichia chaffeensis*, the pathogen responsible for human monocytotropic ehrlichiosis. These results indicate that tick-borne pathogens are not limited to rural or suburban areas. BlantonLucas S., WalkerDavid H., and BouyerDonald H.. Vector-Borne and Zoonotic Diseases. February 2014, 14(2): 168-170. doi:10.1089/vbz.2013.1473.

A Bit of History: 400 Year Old Skeleton Found in a Rhode Island Cave, Possibility of Lyme Disease

A skeleton of a member of the Wampanoag tribe was recently found in a cave near the eastern shore of Narragansett Bay, Rhode Island. Examination of the skeleton revealed the individual was most likely a male in his late 40s. Six *Amblyomma americanum* and nine *Ixodes scapularis* ticks were found in the fur cloth of the individual. These ticks, as well as

abnormalities of the skeleton, including a missing arm and broken rib, raise the possibility of the individual suffering and dying from Lyme disease. Carbon-14 dated the remains and ticks to the year 1600.

Citation: Ghafoor, Tooba, "Skeleton Found in a Rhode Island Cave, Possibility of Lyme Disease" (2014). 2014 Honors Council of the Illinois. Region Papers. Paper 3. <http://dc.cod.edu/hcir2014/3>

Dissertation from Texas on Lone Star Tick Damage to Cattle

Infestation of cattle by Lone Star ticks, *Amblyomma americanum*, leads to damage of hides intended for leather, weight loss, infertility, and potentially death of cattle, which contribute to production losses for farmers. Public concerns regarding chemical residues in food and the environment necessitate development of chemical-free alternative tick controls, such as breeding for tick-resistant phenotypes and developing anti-tick vaccines. See link for access to entire dissertation: Brannan, Jaime Lynette (2013). Transcriptional Profiling of Immune Responses in Cattle Experimentally Infested with *Amblyomma americanum* ticks. Doctoral dissertation, Texas A & M University. Available electronically from <http://hdl.handle.net/1969.1/151106>.

Lone Star Ticks (and others) Expanded into Nebraska Since 1990

Occurrence and County-Level Distribution of Ticks (Acari: Ixodoidea) in Nebraska using Passive Surveillance

A 100 yr (1911–2011) examination of tick submissions was compiled from the U.S. National Tick Collection and three state databases to determine tick species occurrence in Nebraska. Sixteen tick species were identified including *Amblyomma americanum* (L.), *Dermacentor variabilis* (Say), *Dermacentor albipictus* (Packard), *Dermacentor andersoni* Stiles, *Haemaphysalis leporispalustris* (Packard), *Rhipicephalus sanguineus* (Latreille), and *Otobius megnini* (Dugès). *Amblyomma maculatum* Koch and *Ixodes scapularis* Say were identified in only two and four submissions, respectively, but all identifications have occurred after 1990. County submissions were associated with county population, forested area, and number of recreation areas.

By: R. Cortinas¹ and S. M. Spomer, Department of Entomology, 12BC Entomology Hall, PO Box 830816, University of Nebraska-Lincoln, Lincoln, NE 68583-0816

New Tick-borne Disease Found: *Candidatus Neoehrlichia mikurensis*

Infections with the tick-borne bacterium “*Candidatus Neoehrlichia mikurensis*” mimic non-infectious conditions in patients with B cell malignancies or autoimmune diseases

Candidatus Neoehrlichia mikurensis is a newly discovered non-cultivable bacterium spread among ticks and rodents in Europe and Asia that can infect humans, particularly immunocompromised patients.

Candidatus Neoehrlichia mikurensis is an emerging tick-borne pathogen that may give rise to a systemic inflammatory syndrome in persons with hematologic or autoimmune diseases that could be mistaken for recurrence of the underlying disease and/or unrelated arteriosclerotic vascular events. Awareness of this new pathogen is warranted among rheumatologists, hematologists, oncologists, and infectious disease specialists. There is no common name for this disease at this point. The infection responds to doxycycline.

Clinical Infectious Diseases. (2014) doi: 10.1093/cid/ciu189. By A Grankvist, et al.

Organ Transplant Transmits a Tick-borne Disease

Severe life-threatening *Ehrlichia chaffeensis* infections transmitted through solid organ transplantation

Donor-derived infections from organ transplantation are rare occurrences with preoperative screening practices. *Ehrlichia chaffeensis*, a tick-borne illness, transmitted through solid organ transplantation has not been reported previously to our knowledge. We present cases of 2 renal allograft recipients who developed severe *E. chaffeensis* infection after receipt of organs from a common deceased donor. Approximately 3 weeks after renal transplantation, both patients developed an acute febrile illness and rapid clinical decline. Recipient A underwent an extensive infectious workup that revealed positive *E. chaffeensis* DNA from polymerase chain reaction on peripheral blood. Recipient B's clinical team obtained acute and convalescent antibody titers for *E. chaffeensis*, which demonstrated acute infection. Recipients A and B were treated with doxycycline and tigecycline, respectively, with clinical cure.

These cases demonstrate that tick-borne pathogens, such as *E. chaffeensis*, can be transmitted through renal transplantation. *E. chaffeensis* can be associated with excessive morbidity and mortality, commonly owing to delay in diagnosis and poor response to non-tetracycline antibiotics. In populations with endemic tick-borne illness, donors should be questioned about tick exposure, and appropriate antibiotics can be administered if indicated.

S.H. Sachdev et al. Transpl Infect Dis. 2014 Feb;16(1):119-24. doi: 10.1111/tid.12172. Epub 2013 Dec 16.

Notice from the CDC Regarding Lyme Carditis

The Centers for Disease Control and Prevention announces the release of a web page dedicated to providing information about Lyme carditis:

http://www.cdc.gov/lyme/signs_symptoms/lymeCarditis.html

- For general information on Lyme disease, visit: www.cdc.gov/lyme
- For more information on preventing tick bites, please visit: http://www.cdc.gov/lyme/prev/on_people.html
- Please direct additional questions to: <http://www.cdc.gov/cdc-info/requestform.html>

Lyme Disease May Be Sexually Transmitted, Study Suggests: Not Definitive, More Research Needed

A new study suggests that Lyme disease may be sexually transmitted. Lyme disease is a tickborne infection caused by *Borrelia burgdorferi*, a type of corkscrew-shaped bacteria known as a spirochete. The Lyme spirochete resembles the agent of syphilis, long recognized as the epitome of sexually transmitted diseases. Last summer the Centers for Disease Control and Prevention (CDC) announced that Lyme disease is much more common than previously thought, with over 300,000 new cases diagnosed each year in the United States. That makes Lyme disease almost twice as common as breast cancer and six times more common than HIV/AIDS.

The present study was a collaborative effort by an international team of scientists. In addition to Middelveen, a veterinary microbiologist from Canada, researchers included molecular biologists Jennie Burke, Augustin Franco and Yean Wang and dermatologist Peter Mayne from Australia working with molecular biologists Eva Sapi and Cheryl Bandoski, family practitioner Hilary Schlinger and internist Raphael Stricker from the United States.

In the study, researchers tested semen samples and vaginal secretions from three groups of patients: control subjects without evidence of Lyme disease, random subjects who tested positive for Lyme disease, and married heterosexual couples engaging in unprotected sex who tested positive for the disease.

As expected, all of the control subjects tested negative for *Borrelia burgdorferi* in semen samples or vaginal secretions. In contrast, all women with Lyme disease tested positive for *Borrelia burgdorferi* in vaginal secretions, while about half of the men with Lyme disease tested positive for the Lyme spirochete in semen samples. Furthermore, one of the heterosexual couples with Lyme disease showed identical strains of the Lyme spirochete in their genital secretions.

“We don’t yet understand why women with Lyme disease have consistently positive vaginal secretions, whilst semen samples are more variable. Obviously there is more work to be done here.” Dr. Stricker pointed to the unknown risks of contracting Lyme disease raised by the study.

Adapted from Carmel, CA (PRWeb.com) January 25, 2014

http://journals.lww.com/jinvestigativemed/Citation/2014/01000/Western_Regional_Meeting_Abstracts.18.aspx

The Journal of Investigative Medicine 2014;62:280-281

Presented at the Western Regional Meeting of the American Federation for Medical Research, Carmel, CA, January 25, 2014. <http://afmr.org/Western/>

Link to Bibliography on the Persistence of Lyme Disease Despite Antibiotic Treatment

77 Peer-Reviewed Studies, 1977-2012 <http://www.lymeinfo.net/medical/LDPersist.pdf>

Take Care When Visiting Gettysburg National Military Park: Lyme Disease is a Problem

Since 1998, Lyme disease cases have increased in south-central Pennsylvania, which includes Gettysburg National Military Park (NMP). Limited information is available about tick populations or pathogens in this area, and no data regarding frequency of tick bites or prevention measures among Gettysburg NMP employees are available. To address these gaps, ticks were collected, classified, and replaced (to minimize disruptions to tick populations) at two sites within Gettysburg NMP during April–September, 2009, among eight nonremoval samplings. On two additional occasions during May and June, 2009, ticks were collected and removed from the two original sites plus 10 additional sites and tested for tick-borne pathogens by using PCR. A self-administered anonymous survey of Gettysburg NMP employees was conducted to determine knowledge, attitudes, and practices regarding tick-borne diseases. Peak *Ixodes scapularis* nymph populations were observed during May–July. Of 115 *I. scapularis* ticks tested, 21% were infected with *Borrelia burgdorferi*, including 18% of 74 nymphs and 27% of 41 adults; no other pathogen was identified. The entomologic risk index was calculated at 1.3 infected nymphs/hour. An adult and nymph *Amblyomma americanum* were also found, representing the first confirmed field collection of this tick in Pennsylvania, but no pathogens were detected. The survey revealed that most park employees believed Lyme disease was a problem at Gettysburg NMP and that they frequently found ticks on their skin and clothing. However, use of personal preventive measures was inconsistent, and 6% of respondents reported contracting Lyme disease while employed at Gettysburg NMP. These findings indicate a need to improve surveillance for tick bites among employees and enhance prevention programs for park staff and visitors.

George S. Han, Ellen Y. Stromdahl, David Wong, and Andre C. Weltman, Vector-Borne and Zoonotic Diseases, 2014

April 7 Was World Health Day

World Health Day and the World Health Organization (WHO) took the opportunity to highlight the threat of vector-borne diseases - "Small Bite, Big Threat." Below are links to information on the WHO website - including a press release. While there is heavy focus on dengue and malaria, the materials do specifically cite Lyme and tick bites.

WHO World Health Day: Small Bite, Big Threat

<http://www.who.int/campaigns/world-health-day/2014/en/>

WHO World Health Day - Press Release

<http://www.who.int/mediacentre/news/releases/2014/small-bite-big-threat/en/>

Series on Lyme Disease in the New York Times Worth Going Back To

<http://www.nytimes.com/roomfordebate/2013/08/11/deconstructing-lyme-disease>

Lyme disease, which is transmitted by tick bites, is one of the most common infectious diseases in the United States. It may also be one of the most controversial. Since it was recognized in 1975, Lyme has inspired bitter disputes, including over how to treat it and whether the illness can become chronic, dividing scientists, doctors and patients.

Why is it so controversial? And what are the next steps to better understanding this mysterious affliction?

[Focus on the Co-Infections](#) Richard I. Horowitz, doctor

[Antibiotics Are Not the Cure](#) Brian Palmer, reporter

[The Answer to Lyme: Fewer Ticks](#) Richard S. Ostfeld, author, "Lyme Disease: The Ecology of a Complex System"

[My Plight With the Illness](#) Amy Tan, author and co-founder of LymeAid 4 Kids

[Still Lots of Unknowns](#) Monica E. Embers, Tulane National Primate Research Center

[‘Chronic’ Label Is Unhelpful](#) Eugene D. Shapiro and Gary P. Wormser, doctors

[A Community Approach](#) Lyle R. Petersen, Centers for Disease Control and Prevention



Susan Stava for The New York Times

A Deer Shoot on Long Island, February 2014

A selection from the [New York Times article](#): With help from East Hampton Town and East Hampton Village and other communities, the Long Island Farm Bureau is enlisting wildlife-control officials at the Department of Agriculture to kill about 2,000 to 3,000 deer this winter. The slaughter is to begin in February, after hunting season ends, and last a few weeks. Marksmen in elevated stands plan to lure deer to baited stations, firing downward to minimize danger. They may also use traps.

Deer fanciers have sued to block the hunt, calling it barbaric, but they should acknowledge that other things are deplorable, too, like emaciated deer from overabundant herds, and humans sickened by Lyme disease. The predators that would control this situation are gone, and unless Long Islanders want to live with wolves, coyotes, bears and mountain lions, they will have to assume responsibility for their place atop the food chain. Nonlethal solutions, like deer contraception, are expensive, slow and unreliable. “When a population is this far out of balance,” says Allen Gosser of the Agriculture Department, referring to deer, “you need a cull before you can implement other measures,” like birth control.

Lyme Disease Spirochete Found in Ticks and Small Mammals in Louisiana **Detection of Lyme *Borrelia* in Questing *Ixodes scapularis* (Acari: Ixodidae) and Small Mammals in Louisiana**

Lyme borreliosis is caused by spirochetes from the *Borrelia burgdorferi* sensu lato species complex. In the United States, *B. burgdorferi* sensu stricto (s.s.; Johnson, Schmid, Hyde, Steigerwalt, and Brenner) is the most common cause of human Lyme borreliosis. With >25,000 cases reported annually, it is the most common vector-borne disease in the United States. Although approximately 90% of cases are contained to the northeastern and Great Lake states, areas in Canada and some southern states are reporting rises in the number of human disease cases. Louisiana records a few cases of Lyme each year. Although some are most certainly the result of travel to more endemic areas, there exists evidence of locally acquired cases. Louisiana has established populations of the vector tick, *Ixodes scapularis* (Say), and a wide variety of potential reservoir animals, yet Lyme *Borrelia* has never been described in the state. “Using culture and polymerase chain reaction, we investigated the presence of Lyme *Borrelia* in both mammals and questing ticks at a study site in Louisiana. Although culture was mostly unsuccessful, we did detect the presence of *B. burgdorferi* s.s. DNA in 6.3% (11 of 174) of ticks and 22.7% (five of 22) of animal samples. To our knowledge, this is among the first evidence documenting *B. burgdorferi* s.s. in Louisiana.” Further investigations are required to determine the significance these findings have on human and animal health.

Leydet, Brian F.; Liang, Fang-Ting. [Journal of Medical Entomology](#), Volume 51, Number 1, January 2014, pp. 278-282(5)

First Detection of Lyme Disease Spirochete *Borrelia burgdorferi* in Ticks Collected from a Raptor in Canada

During a pan-Canadian tick-host study, we detected the spirochetal bacterium, *Borrelia burgdorferi* sensu lato, which causes Lyme disease, in ticks collected from a raptor. Lyme disease is one of a number of zoonotic, tick-borne diseases causing morbidity and mortality worldwide. Larvae of the avian coastal tick, *Ixodes auritulus*, were collected by wildlife rehabilitators from a Cooper’s hawk, *Accipiter cooperii*, on Vancouver Island, British Columbia.

Not only are passerine (perching) and Gallinaceous (chicken-like) birds involved in the wide dispersal of Lyme disease vector ticks, raptors are now also implicated in the dissemination of *B. burgdorferi* -infected ticks. Although *I. auritulus* does not bite humans, this tick species plays an integral role in the 4-tick enzootic cycle of *B. burgdorferi* along the West Coast of North America. In essence, raptors and *I. auritulus* ticks may help to amplify this infectious agent in nature, and increase the likelihood of people contracting Lyme disease, especially in coastal area

Scott, J. D., J. F. Anderson, and L. A. Durden. "First Detection of Lyme Disease Spirochete *Borrelia burgdorferi* in Ticks Collected from a Raptor in Canada." *J Vet Sci Med Diagn* 24 (2013): 2. Entire paper may be accessed at: <http://www.scitechnol.com/first-detection-of-lyme-disease-spirochete-borrelia-burgdorferi-in-ticks-collected-from-a-raptor-in-canada-SZyB.pdf>

A New Virus Found in Lone Star Ticks

Genome characterization of Long Island tick rhabdovirus, a new virus identified in *Amblyomma americanum* ticks

Rhabdoviruses are important pathogens of animals and plants. Rhabdoviruses include RaV (Rabies virus), VSV (Vesicular stomatitis virus). Rhabdoviruses are transmitted to hosts by arthropods, such as aphids, planthoppers, leafhoppers, black flies, sandflies, and mosquitoes.

As part of a viral surveillance and discovery project in arthropods, the authors used unbiased highthroughput sequencing to examine viromes of ticks collected on Long Island, New York in 2013. They detected and sequenced the complete genome of a novel rhabdovirus originating from a pool of *Amblyomma americanum* ticks. This virus, which we provisionally name Long Island tick rhabdovirus, is distantly related to Moussa virus from Africa. The Long Island tick rhabdovirus may represent a novel species within family *Rhabdoviridae*.

Ed. note: According to the lead author, Dr. Tokarzi, there is no evidence that this virus is pathogenic at this time. These studies are ongoing. (Personal communication, February 17, 2014)

Article URL <http://www.virologyj.com/content/11/1/26> Rafal Tokarzi et al. Center for Infection and Immunity, Mailman School of Public Health, Columbia University, NY. 2014

Lyme Disease Spirochete Found in South America

***Borrelia chilensis*, a new member of the *Borrelia burgdorferi sensu lato* complex that extends the range of this genospecies in the Southern Hemisphere.**

Borrelia burgdorferi sensu lato (s.l.), transmitted by *Ixodes* spp. ticks, is the causative agent of Lyme disease. Although *Ixodes* spp. ticks are distributed in both Northern and Southern Hemispheres, evidence for the presence of *B. burgdorferi* s.l. in South America apart from Uruguay is lacking. We now report the presence of culturable spirochetes with flat-wave morphology and borrelial DNA in endemic *Ixodes stilesi* ticks collected in Chile from environmental vegetation and long-tailed rice rats (*Oligoryzomys longicaudatus*). Cultured spirochetes and borrelial DNA in ticks were characterized by multilocus sequence typing and by sequencing five other loci (16S and 23S ribosomal genes, 5S-23S intergenic spacer, *flaB*, *ospC*). Phylogenetic analysis placed this spirochete as a new genospecies within the Lyme borreliosis group. Its plasmid profile determined by polymerase chain reaction and pulsed-field gel electrophoresis differed from that of *B. burgdorferi* B31A3. The authors proposed naming this new South American member of the Lyme borreliosis group *B. chilensis* VA1 in honor of its country of origin.

Ivanova LB, et al. [Environ Microbiol.](http://dx.doi.org/10.1111/1462-2920.12310) 2014 Apr;16(4):1069-80. doi: 10.1111/1462-2920.12310. Epub 2013 Nov 27.



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