



Tick-Borne Infections Council  
of North Carolina, Inc.

## NEWSLETTER 2016, Volume 6



**Quote of the season (from 1988):** ..."The chronic forms of the disease such as arthritis (joint involvement), acrodermatitis chronica atrophicans (skin involvement), and Bannwart's syndrome (neurological involvement) may last for months to years and are associated with the persistence of the spirochete. A case of maternal-fetal transmission of *B. burgdorferi* resulting in neonatal death has been reported. Domestic animals such as the dog also develop arthritis and lameness to this tick-borne infection. For every symptomatic infection, there is at least one asymptomatic infection. Lyme disease is presently the most commonly reported tick-borne disease in the United States." --- United States Patent Number 4,721,617. "VACCINE AGAINST LYME DISEASE" January 26, 1988

### Highlights...

Scroll down to see these features and more!

#### State Vector-borne Disease Work Group Report

#### Black Bears and Ticks in Louisiana

#### Mystery illness turns out to be Bartonella

#### Massachusetts Passes Lyme Disease Bill

#### Deputy Director of HHS's Office of Women's Health Blogs about Lyme disease

#### Marketing Efforts About a Proposed Lyme Disease Vaccine

#### Ticks in Alaska

### State Vector-Borne Disease Task Force 2016 Meeting Schedule

The November meeting was canceled. The 2017 schedule has not been published yet. (Check with us before going to confirm date as they occasionally change.)

#### **Location:**

Office of the Chief Medical Examiner  
4312 District Drive, Raleigh, NC 27607

Photo ID required.

## 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:

[2015 Rickettsial Disease Memo](#)

[2015 Lyme Disease Memo](#)

[2015 Arboviral Disease Memo](#) (No 2016 letters were issued this year.)

Disease	Total cases by year of report 2013 Final	Total cases by year of report 2014 Preliminary	2015 Final
	Confirmed + Probable (Confirmed/Probable/Suspected)	Confirmed + Probable (Confirmed/Probable/Suspected)*	(Probable/Confirmed)**
Lyme disease	180 (39/141/89)	170 (27/143/86)	192/38
Rickettsioses	426 (11/415/193)	496 (10/486/278)	454/5
Ehrlichioses	78 (24/54/22)	73 (11/62/31)	58/16
Anaplasmoses	15 (1/14/14)	12 (0/12/12)	15/4

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

\*\* Illness onset may be prior to 1/1/15

**Note:** Six counties now have confirmed cases of Lyme disease in two persons who had not traveled out of the county for 30 days after their tick exposure.

**Therefore, these counties are now declared endemic for Lyme disease: Wake, Guilford, Haywood, Alleghany, Buncombe, and Wilkes)**

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

### TIC-NC Talks and Materials Distributed

- **Brochures:**
  - Cole Park Vet Office, Chapel Hill
  - Pittsboro Library
  - Chapel Hill Library
  - Chatham County Public Library
  - Asheville, NC
- **Talks:**
  - SAS Institute, Research Triangle

### CDC: Lyme disease (*Borrelia burgdorferi*) 2011 Case Definition

“This surveillance case definition was developed for national reporting of Lyme disease; **it is not intended to be used in clinical diagnosis.**” The entire definition is at:

[www.cdc.gov/nndss/conditions/lyme-disease/case-definition/2011/](http://www.cdc.gov/nndss/conditions/lyme-disease/case-definition/2011/)

This is confusing because the CDC teaches that the definition should be used for diagnosis.

## Report from the Vectorborne Disease Work Group meeting, August 12, 2016

- The state vectorborne disease memos on tick-borne diseases will not be sent out this year due to delays in the department and the August 2016 resignation of Dr. Megan Davies, Former State Epidemiologist at NCDHHS Division of Public Health, over the coal ash and local well contaminants issue.
- Dr. Zack Moore is now chief in Dr. Davies place.
- Much discussion centered on the Zika virus and NC preparedness should it enter the state.

The state has hired a Master's level entomologist from the Florida Keys and is looking for a second one. There are also plans to hire an epidemiologist "for Zika" but the person will cover all vector-borne diseases. All this is possible because of the monies made available because of the Zika epidemic.

### »» TIC-NC Activities »»

**August.** Thanks to Margaret Tiano from Grand Trees of Chatham for this report: "I just wanted to share with you my experience giving out tick brochures at summer reading at the (Chatham County) library. As I was handing the brochures out to adults, some of the older children asked for a copy since the moms were taking a break in the library. In chatting with them, I can assure you the kids are definitely more aware."



*Grand Trees  
of Chatham*

Tell us about your favorite tree!

## TIC-NC's Webmaster and Board Member Working on the Website

*Webmaster Susan Strozier on the left and Board Member Joanie Alexander on the right. Joanie will be taking over publishing the newsletters and some other web-related activities to give our President Susan Walser time to focus on other things. Joanie has expertise in Spanish and migrant worker issues. She developed our latest trifold brochure for the public—Spanish on one side and English on the other. See it on the Home page on our website. Let us know if you need some.*



## Black Bears and Ticks in Louisiana

### Detection of human bacterial pathogens in ticks collected from Louisiana black bears (*Ursus americanus luteolus*).

There are 4 major human-biting tick species in the northeastern United States, which include: *Amblyomma americanum*, *Amblyomma maculatum*, *Dermacentor variabilis*, and *Ixodes scapularis*. The black bear is a large mammal that has been shown to be parasitized by all the aforementioned ticks. We investigated the bacterial infections in ticks collected from Louisiana black bears (*Ursus americanus* subspecies *luteolus*). Eighty-six ticks were collected from 17 black bears in Louisiana from June 2010 to March 2011. All 4 common human-biting tick species were represented. Each tick was subjected to polymerase chain reaction (PCR) targeting select bacterial pathogens and symbionts. Bacterial DNA was detected in 62% of ticks (n=53). *Rickettsia parkeri*, the causative agent of an emerging spotted fever group rickettsiosis, was identified in 66% of *A. maculatum*, 28% of *D. variabilis*, and 11% of *I. scapularis*. The Lyme disease bacterium, *Borrelia burgdorferi*, was detected in 2 *I. scapularis*, while one *A. americanum* was positive for *Borrelia bissetii*, a putative human pathogen. The rickettsial endosymbionts *Candidatus Rickettsia andeanae*, rickettsial endosymbiont of *I. scapularis*, and *Rickettsia amblyommii* were detected in their common tick hosts at 21%, 39%, and 60%, respectively. All ticks were PCR-negative for *Anaplasma phagocytophilum*, *Ehrlichia* spp., and *Babesia microti*. This is the first reported detection of *R. parkeri* in vector ticks in Louisiana; we also report the novel association of *R. parkeri* with *I. scapularis*. Detection of both *R. parkeri* and *B. burgdorferi* in their respective vectors in Louisiana demands further investigation to determine potential for human exposure to these pathogens. Leydet & Liang. [Ticks Tick Borne Dis.](#) 2013 Apr;4(3):191-6. doi: 10.1016/j.ttbdis.2012.12.002. Epub 2013 Feb 15

## Mystery illness turns out to be *Bartonella*

When Jason Sigmon was 13, he got bitten by a tick while helping his dad with yard work. Within a week or so, the North Carolina teen started experiencing excruciating headaches. Sometimes the pain was so bad he threw up. Pain medication didn't help, and he was utterly incapacitated.



The family consulted a slew of doctors, who tested the boy for many things. The doctors ruled out Lyme disease and other tick-borne infections based on antibody tests. They ruled out brain tumor based on an MRI and other scans. When the doctors couldn't put a finger on what was causing the problem, they called it "teenage migraines" and recommended specialized treatment in a hospital.

His mom, veterinarian Betsy Sigmon, had her doubts about that diagnosis. Although Jason's blood work showed no evidence of Lyme or co-infections, she couldn't ignore the fact that Jason's symptoms came on shortly after that tick bite.

She contacted another veterinarian, Dr. Ed Breitschwerdt, of North Carolina State University, who studies tick-borne diseases. Breitschwerdt tested Jason's blood using PCR analysis and found that the boy had *Bartonella*. It's a bacterium which can infect both animals and humans, and is carried by fleas,

body lice, and ticks. Although not well known in the medical community, Bartonella has been found to cause a wide variety of symptoms, including severe headaches.

Subsequent treatment for Bartonella brought Jason his first pain relief since the problem began. Jason is a college student now. He and his mom are featured in a video from Galaxy Diagnostics, a Bartonella testing company co-founded by Dr. Breitschwerdt.

In an interview several years ago with the News and Observer, a North Carolina newspaper, Dr. Breitschwerdt asserted that Bartonella should be considered whenever otherwise healthy people develop sudden, chronic illnesses. But that requires broader awareness of Bartonella among treating physicians. As he told the newspaper, “You can’t diagnose what you don’t know exists.”

## ▣▣ National Section ▣▣

### **Massachusetts Senate confirmed the passage of a bill (H.4491) requiring that insurance companies cover antibiotic treatment for Lyme disease for any length of time**

On July 31 at 11:57 p.m., the Senate overrode Governor Baker's veto by a vote of 37-1, on the heels of the House voting to override by 153-3 on July 30. The House also quickly rejected an attempt by the Governor to introduce a new bill on Lyme treatment that was deemed not to be an improvement over the status quo.

The bill, which goes into effect immediately, will require that insurance companies cover antibiotic treatment for Lyme disease for any length of time, when prescribed by a licensed physician. Previously, some insurance plans had set arbitrary cutoff times for coverage, citing expired treatment guidelines.

Representative David Linsky (D-Natick), citing his son's own battle with the disease, championed the cause by convening a special commission, releasing its report in 2013 with over 140 legislators co-signing onto the bill when it was first submitted this session.

The bill has an emergency preamble and goes into effect immediately. Having been vetted by the Center for Health Information and Analysis, the legislation is predicted to cost 0-11 cents in additional premiums per policy per year.

The legislation mandating insurance coverage is functionally identical to a Rhode Island insurance mandate that has been helping Lyme Disease victims since 2004. Although the Massachusetts Infectious Diseases Society and small business lobbyists spoke out against it, there was strong support from the International Lyme and Associated Diseases Society; the American Council of Engineering Companies of Massachusetts; the Massachusetts Association of Land Surveyors and Civil Engineers; the advocacy groups Lyme Disease Association, [Lymedisease.org](http://Lymedisease.org), the Massachusetts Lyme Legislative Task Force, the Massachusetts Lyme Coalition; and patients and their families across the

Commonwealth. – from the **Massachusetts Lyme Disease Legislative Task Force** Bill at:  
<https://malegislature.gov/Bills/189/House/H4491>

## **A Book for Parents with a Child with Lyme**

*TOUCHED BY LYME* is written by **Dorothy Kupcha Leland**, *LymeDisease.org's* VP for Education and Outreach. She is co-author of *When Your Child Has Lyme Disease: A Parent's Survival Guide*. Contact her at [dleland@lymedisease.org](mailto:dleland@lymedisease.org).

## **Borrelia miyamotoi Infection in Patients from Upper Midwestern United States, 2014–2015**

From the CDC: We confirmed *Borrelia miyamotoi* infection in 7 patients who had contracted an illness while near La Crosse, Wisconsin, USA, an area where *Ixodes scapularis* ticks are endemic. *B. miyamotoi* infection should now be considered among differential diagnoses for patients from the midwestern United States who have signs and symptoms suggestive of tickborne illness.

[http://wwwnc.cdc.gov/eid/article/22/8/15-1878\\_article#comment](http://wwwnc.cdc.gov/eid/article/22/8/15-1878_article#comment)

## **Fatigue in Patients with Erythema Migrans (Lyme Disease)**

- Fatigue was assessed in patients with Lyme disease presenting with erythema migrans (EM).
  - Over 50% of patients with EM had fatigue, and ~20% had severe fatigue based on the FSS-11 scale.
  - Having a large number of symptoms was associated with both the presence and severity of fatigue.
  - This finding suggests that fatigue with EM may be a component of the acute sickness response.
- Since prior studies have demonstrated the presence of elevated levels of pro-inflammatory cytokines and other molecules in the serum of highly symptomatic patients with erythema migrans, the symptom of fatigue in early Lyme disease may be a component of what has been referred to as the acute sickness response. Wormser et al. DOI: Diagnostic Microbiology & Infectious Disease.  
<http://dx.doi.org/10.1016/j.diagmicrobio.2016.07.026>

## **Ticks in Alaska**

### **New Records of Ticks (Acari: Ixodidae) From Dogs, Cats, Humans, and Some Wild Vertebrates in Alaska: Invasion Potential**

During 2010–2016, tick specimens were solicited from veterinarians, biologists, and members of the public in Alaska. Eight species of ticks were recorded from domestic dogs. Some ticks were collected from dogs with recent travel histories to other countries or other U.S. states, which appears to explain records of ticks not native to Alaska such as *Amblyomma americanum* (L.) (lone star tick), *Ixodes scapularis* (Say) (blacklegged tick), and *Ixodes ricinus* (L.). However, we recorded *Dermacentor variabilis* (Say) (American dog tick) from dogs (and humans) both with and without travel history, suggesting that this nonindigenous tick could be establishing populations in Alaska. Other ticks commonly recorded from dogs included the indigenous *Ixodes angustus* Neumann and the invasive *Rhipicephalus sanguineus* (Latreille) (brown dog tick). Domestic cats were only parasitized by one tick



species, the native *I. angustus*. Six species of ticks were recorded from humans: *A. americanum* (with and without travel history), *Dermacentor andersoni* Stiles (Rocky Mountain wood tick; travel associated), *D. variabilis* (with and without travel history), *Haemaphysalis leporispalustris* (Packard) (rabbit tick, native to Alaska), *I. angustus*, and *R. sanguineus*. *Ixodes angustus* predominated among tick collections from native mammals. Also, *Ixodes texanus* Banks (first record from Alaska) was collected from an American marten, *Martes americana* (Turton), *H. leporispalustris* was recorded from a snowshoe hare, *Lepus americanus* Erxleben, and *Ixodes auritulus* Neumann was collected from a Northwestern crow, *Corvus caurinus* Baird. The establishment of *D. variabilis*, *D. andersoni*, *A. americanum*, and/or *I. scapularis* in Alaska would have strong implications for animal and human health. Lance A. Durden, Kimberlee B. Beckmen, Robert F. Gerlach DOI: <http://dx.doi.org/10.1093/jme/tjw128> First published online: 14 August 2016

## Limits on Antibiotic Use

**Proposed New Medicare Regulation Limits Antibiotic Based on Guidelines That Ration Care, Warns the Association of American Physicians and Surgeons (AAPS) August 2016**

<http://www.prnewswire.com/news-releases/proposed-new-medicare-regulation-limits-antibiotic-based-on-guidelines-that-ration-care-warns-the-association-of-american-physicians-and-surgeons-aaps-300313413.html>

Excerpt: "AAPS executive director Jane M. Orient, M.D., observes that "private standard-setting organizations should not be granted the authority of federal law through the back door of regulations promulgated under the Medicare program. Patients should be treated until they are restored to good health, and not face premature termination of antibiotic use based on private guidelines developed for the benefit of payers."

## Deputy Director of HHS's Office of Women's Health Blogs about Lyme disease

Nicole Greene, the Deputy Director for the U. S. Department of Health and Human Services Office on Women's Health has chronic Lyme disease and blogs about it at: <http://www.womenshealth.gov/blog/my-life-with-lyme.html>

»» International Section »»

## The Way Ticks Work

### Genomic insights into the *Ixodes scapularis* tick vector of Lyme disease

Ticks transmit more pathogens to humans and animals than any other arthropod. We describe the 2.1 Gbp nuclear genome of the tick, *Ixodes scapularis* (Say), which vectors pathogens that cause Lyme disease, human granulocytic anaplasmosis, babesiosis and other diseases. The large genome

reflects accumulation of repetitive DNA, new lineages of retro-transposons, and gene architecture patterns resembling ancient metazoans rather than pancrustaceans. Annotation of scaffolds representing ~57% of the genome, reveals 20,486 protein-coding genes and expansions of gene families associated with tick–host interactions. We report insights from genome analyses into parasitic processes unique to ticks, including host ‘questing’, prolonged feeding, cuticle synthesis, blood meal concentration, novel methods of haemoglobin digestion, haem detoxification, vitellogenesis and prolonged off-host survival. We identify proteins associated with the agent of human granulocytic anaplasmosis, an emerging disease, and the encephalitis-causing Langat virus, and a population structure correlated to life-history traits and transmission of the Lyme disease agent. Nuss et al. *Nature Communications* 7, Article number: 10507 (2016) doi:10.1038/ncomms10507 | <http://www.nature.com/articles/ncomms10507>

## **Lyme Disease in Cats in Europe, Far Less Than in Dogs**

### **Seropositivity of *Borrelia burgdorferi* in a cohort of symptomatic cats from Europe based on a C6-peptide assay with discussion of implications in disease aetiology.**

There are only a few reports on Lyme borreliosis (LB) in cats. The reasons might be a different tick infestation in cats compared to dogs, a low susceptibility for tick-borne infections or a low awareness of veterinarians for tick-borne diseases in feline patients. The aim of this study was to determine the proportion of antibodies against *Borrelia burgdorferi* sensu lato (Bbsl) in feline sera, to compare the significance of feline versus canine LB, as well as to evaluate possible implications on disease occurrence. Specific antibodies against the C6-peptide of Bbsl in cats were detected by a rapid test based on enzyme immunoassay technique. The serum samples were sent to a diagnostic laboratory by veterinarians from Germany and other European countries with request for *Borrelia* serology in the years 2009-2011. Veterinarians were asked for information regarding the cats' location, age, gender, clinical signs, treatment and follow-up. In six of 271 (2.2%; 95% CI: 0.8-4.8%) cat sera, antibodies against the C6-peptide of Bbsl were detected.

Proportion of *Borrelia* antibody-positive cat sera was significantly lower than the one determined for dogs during the same time period. All positive cats lived in countries endemic for LB (Germany, Sweden and Belgium), and all C6-antibody positive cats with the exception of one cat showed clinical signs. Possible implications on disease occurrence are discussed. Data presented here demonstrate a lower prevalence of *Borrelia* specific C6-antibodies in European cats when compared to dogs residing in the same regions. The absence of antibodies against Bbsl in 97.8% (95% CI: 95.2-99.2%) of the submitted samples indicate that diagnosis "feline LB" is rare in cats.

Nevertheless, LB should be considered in cats with compatible clinical signs (e.g. shifting leg lameness, to less extent neurological signs) when other differential diagnoses are ruled out. Pantchey, et al. [Berl Munch Tierarztl Wochenschr.](#) 2016 Jul-Aug;129(7-8):333-9.

## **Marketing Efforts: Proposed Lyme Disease Vaccine Seemed More Acceptable to Asians Whether in Asia or America**

### **Intentions to receive a potentially available Lyme disease vaccine in an urban sample.**

The only human Lyme disease vaccine of LYMERix was voluntarily removed from the market in the United States in 2002 for a number of reasons. A new human Lyme disease vaccine is currently being developed. Fogel and Kutz surveyed 714 participants to determine variables associated with intentions to receive a Lyme disease vaccine. Predictor variables included demographics, protection



motivational theory, Lyme disease knowledge, Lyme disease preventive behaviors, beliefs and perceived health.

They found in multivariate linear regression analyses that Asian/Asian American race/ethnicity ( $p < 0.001$ ), South Asian race/ethnicity ( $p = 0.01$ ) and coping appraisal variables of response efficacy ( $p < 0.001$ ) and self-efficacy ( $p < 0.001$ ) were each significantly associated with increased intentions. The belief that vaccines are typically not safe was significantly associated with decreased intentions ( $p = 0.03$ ).

Asian/Asian American and South Asian race/ethnicity's have a strong interest in receiving a Lyme disease vaccine. Although pharmaceutical companies may benefit by advertising a Lyme disease vaccine to these populations, marketers need to address and use approaches to interest those from other race/ethnicity's. Also marketers need to address the erroneous belief that vaccines are typically not safe in order to interest those with such beliefs to use a Lyme disease vaccine. Fogel & Kutz. *Ther Adv Vaccines*. 2016 Jan;4(1-2):3-14. doi: 10.1177/2051013616629881.

### *Advertisement*



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