



Tick-Borne Infections Council  
of North Carolina, Inc.

## NEWSLETTER 2019, Volume 3



**Quote:** - “The full public health and agricultural impact of this tick discovery and spread is unknown. In other parts of the world, the Asian longhorned tick can transmit many types of pathogens common in the United States.” Ben Beard, PhD, deputy director of CDC’s Division of Vector-Borne Diseases

### Highlights...

- **Our new Volunteer Corner**
- **Lyme disease is present in Mexico**
- **US spends more on health care, has lower life expectancy, higher infant mortality**
- **Blacklegged ticks and northern and southern questing behavior**
- **Prevalence and Severity of Food Allergies Among US Adults (does not include alpha gal)**
- **Asian longhorn tick now on Staten Island**
- **Test that distinguishes severe alpha-gal allergy from being sensitive without symptoms**
- **Certain birds may spread tick-borne diseases in Europe**
- **And more!**

### State Vector-Borne Disease Working Group 2019 Meeting Schedule

- **Date:** Friday, **July 19, 2019**; **Location:** Webinar format, due to height of tick and beginning of mosquito seasons. **Time:** 10 am. All VBDW members on the listserv will receive a link to attend via email.
- **Date:** Friday, **November 15, 2019**; **Location:** TBD, but likely The State Laboratory of Public Health. **Time:** 10 am. (Check with us before going to confirm date as they occasionally change.)

## Links to state memo to medical providers from the State Department of Public Health on Lyme disease and Rickettsial diseases

The state has now combined their annual previous separate memos on Lyme disease and rickettsial diseases into one. It can be found on our homepage, <http://tic-nc.org>, halfway down on the right side.

## Where to Find CDC Case Definitions and their Statement that the Surveillance Case Definitions Are “not to be used as the sole criteria for establishing critical diagnosis”

Go to: [www.cdc.gov/lyme/stats/forms.html](http://www.cdc.gov/lyme/stats/forms.html) (The links below in a clip of the website are not active.) Scroll down and find “Case Definition and Report Forms”. See the grey box with “Note” containing the disclaimer.

### Case Definition and Report Forms

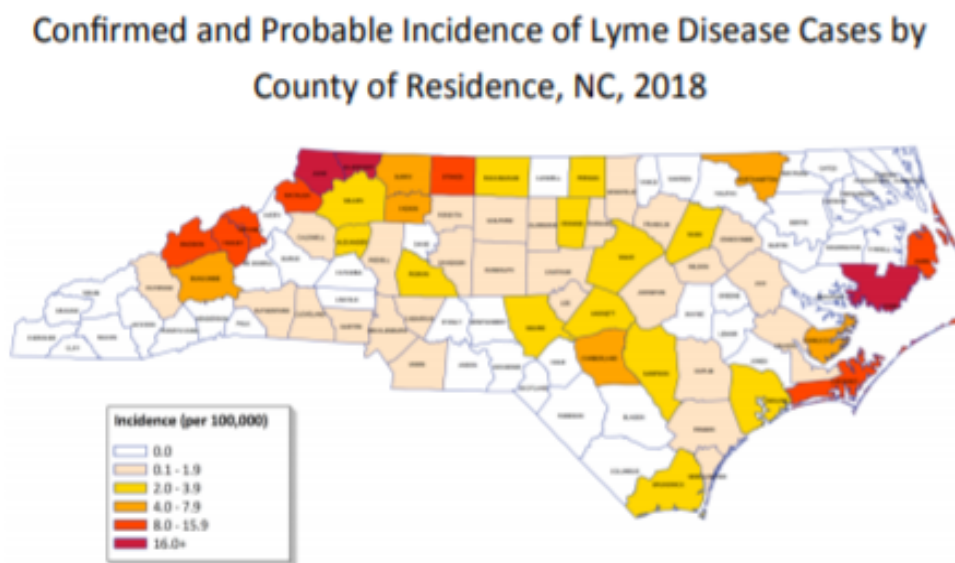
- [Lyme Disease Surveillance Case Definition](#) (revised Jan 2017)
- [Lyme Disease Surveillance Case Report Form](#) [PDF – 2 pages] (for public health officials' use)

**Note:** Surveillance case definitions establish uniform criteria for disease reporting and should not be used as the sole criteria for establishing clinical diagnoses, determining the standard of care necessary for a particular patient, setting guidelines for quality assurance, or providing standards for reimbursement.

Accessed and copied 15 August 2017.

## State tick research or data

See the link below for **2018 state data on Lyme disease**: Developed by the North Carolina Division of Public Health, Communicable Disease Branch Lyme Disease Surveillance Summary from 2013—2018. Several charts and maps are available.



[epi.ncpublichealth.info/cd/lyme/LymeSurveillanceSummary2018.pdf](http://epi.ncpublichealth.info/cd/lyme/LymeSurveillanceSummary2018.pdf)

Summary data for all reportable conditions are available here: [epi.publichealth.nc.gov/cd/diseases.html](http://epi.publichealth.nc.gov/cd/diseases.html)

# NC EDSS Event Data – Cases Submitted to CDC

Disease	Total Cases / Confirmed Cases by year of report 2017	Total preliminary confirmed and probable Events in NC EDSS Created between 1/1/2018 – 11/13/2018*	Total Events Reviewed and closed by NC DPH 1/1/18 – 11/13/18	Total Events Still Under Investigation by LHD 1/1/18 – 11/13/18	Total Events created in NC EDSS 1/1/18 – 11/13/18
Lyme Disease	298/71C	177/51C	736	110	836
RMSF	521/6C	419/10C	2016	346	2362
Ehrlichiosis	72/18C	86/14C	331	54	398
Anaplasmosis	10/4C	4/0C	22	1	23

NC EDSS (Electronic Disease Surveillance System)

**Note:** By the *former* CDC definition, six counties had 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 were endemic for Lyme disease by the former CDC definition: Wake, Guilford, Haywood, Alleghany, Buncombe, and Wilkes.** Counties with one case of locally acquired Lyme disease were: 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 Materials Distributed

### Brochures/booklets:

Catawba Lands Conservancy  
Town of Black Mountain  
Pittsboro Ag Fest, March 2019

## Sign developed for state parks, 2018-2019



## Volunteer Corner



Our enthusiast Asheville volunteer has spread tick information far and wide in her area. Her latest accomplishment is getting the Town of Black Mountain to have links to our booklet, our tri-fold English-Spanish folder, and more. See: [nc-blackmountain.civicplus.com](http://nc-blackmountain.civicplus.com), She also handed out many of our booklets in downtown Black Mountain. Thank you, Janet Dooley!



Thank you, Ranger Brian Bockhahn, Regional Education Specialist, North District Office, North Carolina State Parks

## TIC-NC Activities

Board member Joanie Alexander distributed the following materials this spring 2019

	<u>Folletos</u>	<u>Booklets</u>	<u>Stickers</u>
Haw River State Park	200	10	10
Guilford County Parks	300	40	20
REI Greensboro	50		
Eno River State Park	100		
Samantha's Pupusas	50		
Ixtapa restaurant	70		
Hillsborough County Parks	150	50	10
Orange County Parks	150	100	10
Jordan Lake State Parks	250	100	20
Umstead State Park	200		20
REI Southpoint	50	50	
Piedmont Health	800	150	10
El Centro Hispano Durham	100		
El Centro Hispano Carrboro	125		
Triangle Land Conservancy			15

\*Bilingual Folletos at <http://tic-nc.org/wp-content/uploads/2016/12/FoletoEnglishSpanish.pdf>

Booklets [http://tic-nc.org/wp-content/uploads/2018/04/TiCNC-tickbrochure\\_Apr2018c.pdf](http://tic-nc.org/wp-content/uploads/2018/04/TiCNC-tickbrochure_Apr2018c.pdf)

NC Farmworker Health Program is connecting their outreach workers with the bilingual materials on our website.

Board member and Scientific Adviser Marcia Herman-Giddens attended the Founders Breakfast put on by a new nonprofit, Tick-borne Conditions United. It was held at Fair Game in Pittsboro, North Carolina, a delightful venue. The photo shows the two founders, Jennifer Platt, DrPH, and Beth Carrison, INHC. Jennifer is from Pittsboro and Beth is from Massachusetts and Maine. TCU is interested in all tick-borne diseases and conditions while bringing special focus to lesser-known ones such as alpha-gal.

A panel gave short tick-related talks that evening in Pittsboro for TCU. TIC-NC had a display at that event. Marcia spoke on the history of Lyme disease in Chatham County, North Carolina.



## **Blacklegged ticks and northern and southern questing behavior**

### **Nymphal *Ixodes scapularis* questing behavior explains geographic variation in Lyme borreliosis risk in the eastern United States**

Most people who contract Lyme borreliosis in the eastern United States (US) acquire infection from the bite of the nymphal life stage of the vector tick *Ixodes scapularis*, which is present in all eastern states. Yet <5% of Lyme borreliosis cases are reported from outside the north-central and northeastern US.

Geographical differences in nymphal questing (i.e., host-seeking behavior) may be epidemiologically important in explaining this latitudinal gradient in Lyme borreliosis incidence. Using field enclosures and a ‘common garden’ experimental design at two field sites, we directly tested this hypothesis by observing above-litter questing of laboratory-raised nymphal *I. scapularis* whose parents were collected from 15 locations (= origins) across the species' range. Relative to southern nymphs from origins considered to be of low acarologic risk, northern nymphs from high-risk origins were eight times as likely to quest on or above the surface of the leaf litter. This regional variation in vector behavior (specifically, the propensity of southern nymphs to remain under leaf litter) was highly correlated with Lyme borreliosis incidence in nymphs' counties of origin.

We conclude that nymphal host-seeking behavior is a key factor contributing to the low incidence of Lyme borreliosis in southern states. Expansion of northern *I. scapularis* populations could lead to increased incidence in southern states of Lyme borreliosis and other diseases vectored by this tick, if the ‘northern’ host-seeking behavior of immigrant nymphs is retained. Systematic surveillance for *I. scapularis* nymphs questing above the leaf litter in southern states will help predict future geographic change in *I. scapularis*-borne disease risk. Arsnoe et al., Ticks and Tick-borne Diseases.

<https://www.sciencedirect.com/science/article/abs/pii/S1877959X18303716?via%3Dihub>

### **Assessment of Entomological Risk for Lyme Borreliosis Along a North-to-South Gradient from Southern Virginia into North Carolina**

Lyme disease (LD) has become the most prevalent vector-borne disease in the United States and the sixth Nationally Notifiable disease. Surveillance of Lyme disease from the 1992-2016 has shown a sustained documented expansion of LD moving south into the border of Virginia and North Carolina, west into West Virginia, Tennessee, northwest into North Dakota, and North into Canada. This expansion of LD seems to be associated with expansion of the disease vector *Ixodes scapularis*, with newly established populations in the southwestern Appalachian and Piedmont regions of Virginia.

The goal of the study was to characterize the entomological risk of the spread of LD from VA into NC. To determine the distribution and infection prevalence of *I. scapularis* along a northeastern-to-southwestern gradient from VA to NC, tick-flagging and hunter-harvested deer tick collecting approaches were used with samples tested by the CDC for infection. Flagging was comprised of periodic sampling sessions from October 2015 to July 2017, conducted at Fairy Stone, Mayo River,

Hanging Rock, Pilot Mountain, Yadkin Island Park, and Lake Norman State Parks. Hunted deer processing stations Hilltop Farms (Walnut Cove, NC) and Game Butchers (Troutman, NC), were used for collecting ticks from hunter-harvested deer covering counties for the northern, central and southern North Carolina Piedmont regions... .

*Ixodes scapularis* results collected from flagging, and hunter-harvested deer are highly suggestive of a north-to-south gradient in *I. scapularis* densities with Alexander and Iredell being the south-most *I. scapularis* positive counties. *Borrelia burgdorferi* infection results also suggest a north-to-south distribution, with *B. burgdorferi* appearing to have only made it as far south as the central counties of Yadkin and Forsyth. Entomological risk estimates for density of infected nymphs (DIN) and adults (DIA) of flagging and hunted deer also showed a north-to-south trend with Fairy Stone State Park having the highest (0.033) DIN and northern NC region having the highest (0.808) DIA. The results are consistent with first the spread of the vector followed by the pathogen. Teague JL III, Master's thesis. The University of North Carolina at Greensboro, ProQuest Dissertations Publishing, 2018. 10787075. Link for entire paper: <https://search.proquest.com/openview/53be7aafb3fb461a2bc1acce2588b86/1?pq-origsite=gscholar&cbl=18750&diss=y>

## Poster on Alpha gal and bacteria in ticks, seems that more research on this would be helpful

### 469 Tick bites and IgE sensitization to the oligosaccharide galactose- $\alpha$ -1,3-galactose ( $\alpha$ -Gal): a Bacterial Hypothesis



Maya K. C. Retterer, BA, Jeffrey M. Wilson, MD, PhD, Lisa Workman, BA, and Thomas A. E. Platts-Mills, MD, PhD, FAAAAI, FRS; Division of Asthma, Allergy & Immunology, University of Virginia Health System, Charlottesville, VA.

**RATIONALE:** IgE to  $\alpha$ -Gal is causal in delayed anaphylaxis to mammalian meat and relates to bites from hard ticks. Though it is unclear whether ticks intrinsically express  $\alpha$ -gal, these glycans have been shown to be present in tick saliva. Because gram-negative enteric bacteria are known to express  $\alpha$ -Gal, we considered the possibility that the source of  $\alpha$ -Gal relates to symbionts in lone star ticks. Of the lone star tick symbionts known to overlap the distribution of  $\alpha$ -Gal cases [i.e. *Rickettsia* spotted fever group (SFG) and *Ehrlichia chaffeensis*], *Rickettsia amblyommii*, which only causes a mild clinical syndrome, is most prevalent. To explore this hypothesis we sought to assess seroprevalance to *Rickettsia* SFG and *Ehrlichia* in subjects sensitized to  $\alpha$ -Gal.

**METHODS:** Sera from 369 subjects in central Virginia were available from a large observational study designed to investigate IgE sensitization to  $\alpha$ -Gal. IgG to *Rickettsia* SFG and *Ehrlichia chaffeensis* were assayed by commercially available ELISA and micro-immunofluorescence kits, respectively.

**RESULTS:** 280 subjects were positive for IgE to  $\alpha$ -Gal (76%). Of these, 21% (59/280) were positive for IgG to *Rickettsia*. In the 89 subjects not sensitized to  $\alpha$ -Gal, 15% (13/89) were positive for IgG to *Rickettsia*. In preliminary investigation we have observed similar results in the *Ehrlichia* assays.

**CONCLUSIONS:** Seroprevalance to *Rickettsia* trends higher ( $p=0.18$ ) in subjects sensitized to  $\alpha$ -Gal but nonetheless is absent in nearly 80% of cases. Although the tests used may not be sufficiently sensitive to identify subclinical exposure, the current data do not support a link between tick-borne bacteria and  $\alpha$ -Gal sensitization.

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## ▣▣ National Section ▣▣

### **Parasympathetic failure and mild or moderate sympathetic adrenergic failure in some of the 10 study patients with “post-treatment Lyme disease”**

#### **Association of small fiber neuropathy and post treatment Lyme disease syndrome**

**Objectives.** To examine whether post-treatment Lyme disease syndrome (PTLDS) defined by fatigue, cognitive complaints and widespread pain following the treatment of Lyme disease is associated with small fiber neuropathy (SFN) manifesting as autonomic and sensory dysfunction.

**Methods.** This single center, retrospective study evaluated subjects with PTLDS. Skin biopsies for assessment of epidermal nerve fiber density (ENFD), sweat gland nerve fiber density (SGNFD) and functional autonomic testing (deep breathing, Valsalva maneuver and tilt test) were performed to assess SFN, severity of dysautonomia and cerebral blood flow abnormalities. Heart rate, end tidal CO<sub>2</sub>, blood pressure, and cerebral blood flow velocity (CBFv) from middle cerebral artery using transcranial Doppler were monitored.

**Results.** 10 participants, 5/5 women/men, age  $51.3 \pm 14.7$  years, BMI  $27.6 \pm 7.3$  were analyzed. All participants were positive for Lyme infection by CDC criteria. At least one skin biopsy was abnormal in all ten participants. Abnormal ENFD was found in 9 participants, abnormal SGNFD in 5 participants, and both abnormal ENFD and SGNFD were detected in 4 participants. Parasympathetic failure was found in 7 participants and mild or moderate sympathetic adrenergic failure in all participants. Abnormal total CBFv score was found in all ten participants. Low orthostatic CBFv was found in 7 participants, three additional participants had abnormally reduced supine CBFv. Novak P, et al. PLoS ONE 14(2): e0212222. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0212222> .

### **Multiple Systemic Infectious Disease Syndrome (MSIDS) is a multifactorial model for treating chronic disease**

#### **Precision Medicine: The Role of the MSIDS Model in Defining, Diagnosing, and Treating Chronic Lyme Disease/Post Treatment Lyme Disease Syndrome and Other Chronic Illness: Part 2**

We present a precision medical perspective to assist in the definition, diagnosis, and management of Post Treatment Lyme Disease Syndrome (PTLDS)/chronic Lyme disease. PTLDS represents a small subset of patients treated for an erythema migrans (EM) rash with persistent or recurrent symptoms and functional decline. The larger population with chronic Lyme disease is less understood and well defined.

Multiple Systemic Infectious Disease Syndrome (MSIDS) is a multifactorial model for treating chronic disease(s), which identifies up to 16 overlapping sources of inflammation and their downstream effects. A patient symptom survey and a retrospective chart review of 200 patients was therefore performed on those patients with chronic Lyme disease/PTLDS to identify those variables on the MSIDS model with the greatest potential effect on regaining health.

Results indicate that dapson combination therapy decreased the severity of eight major Lyme symptoms, and multiple sources of inflammation (other infections, immune dysfunction, autoimmunity, food allergies/sensitivities, leaky gut, mineral deficiencies, environmental toxins with detoxification problems, and sleep disorders) along with downstream effects of inflammation may all affect chronic symptomatology. In part two of our observational study and review paper, we postulate that the use of this model can represent an important and needed paradigm shift in the diagnosis and treatment of chronic disease. Horowitz and Freeman, Healthcare 2018, 6, 129; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6316761/>.

## **Prevalence and Severity of Food Allergies Among US Adults**

In a population-based survey study of 40 443 US adults, an estimated 10.8% were food allergic at the time of the survey, whereas nearly 19% of adults believed that they were food allergic. Nearly half of food-allergic adults had at least 1 adult-onset food allergy, and 38% reported at least 1 food allergy-related emergency department visit in their lifetime. Most common: shellfish (2.9%), milk (1.9%), peanut (1.8%), tree nut (1.2%), and fin fish (0.9%). Gupta et al. *JAMA Netw Open*. 2019;2(1):e185630. <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2720064>. Entire article free of charge. Ed. note. This study evidently did not include or ask about alpha gal allergy.

## **Test that distinguishes severe alpha-gal allergy for those with and without symptoms**

### **The basophil activation test differentiates between patients with alpha-gal syndrome and asymptomatic alpha-gal sensitization**

**BACKGROUND:** Galactose-alpha-1,3-galactose (alpha-gal) syndrome is characterized by the presence of serum specific IgE antibodies to alpha-gal and delayed type I allergic reactions to the carbohydrate alpha-gal after consumption of mammalian (red) meat products and drugs of mammalian origin. Diagnostics currently rely on patient history, skin tests, determination of serum specific IgE antibodies, and oral food or drug challenges.

**OBJECTIVE:** We sought to assess the utility of different basophil parameters (basophil reactivity and sensitivity, the ratio of the percentage of CD63+ basophils induced by the alpha-gal-containing allergen to the percentage of CD63+ basophils after stimulation with anti-FcεRI antibody [%CD63+/anti-FcεRI], and area under the dose-response curve [AUC]) as biomarkers for the clinical outcome of patients with alpha-gal syndrome compared with subjects with asymptomatic alpha-gal sensitization.

**METHODS:** In addition to routine diagnostics, a basophil activation test (Flow CAST) with different concentrations of alpha-gal-containing allergens (eg, commercially available alpha-gal-carrying proteins and pork kidney extracts) was performed in 21 patients with alpha-gal syndrome, 12 alpha-gal-sensitized subjects, and 18 control subjects.

**RESULTS:** Alpha-gal-containing allergens induced strong basophil activation in a dose-dependent manner in patients. Basophil reactivity at distinct allergen concentrations, the %CD63+/anti-FcεRI ratio across most allergen concentrations, the AUC of dose-response curves, and basophil allergen threshold sensitivity (CD-sens) with pork kidney extract were significantly higher in patients with alpha-gal syndrome compared with those in sensitized subjects. All parameters were negative in control subjects.

**CONCLUSION:** The basophil activation test should be considered as an additional diagnostic test before performing time-consuming and potentially risky oral provocation tests. The %CD63+/anti-

FceRI ratio for all allergens and AUCs for pork kidney were the best parameters for distinguishing patients with alpha-gal syndrome from subjects with asymptomatic alpha-gal sensitization. Mehlich J, et al. J Allergy Clin Immunol. 2019 Jan;143(1):182-189. <https://www.ncbi.nlm.nih.gov/pubmed/30125663>.

## Asian longhorn tick now on Staten Island

### Distribution, host-seeking phenology, and host and habitat associations of *Haemaphysalis longicornis* ticks, Staten Island, New York, USA.

*Haemaphysalis longicornis*, and invasive Ixodid tick, was recently reported in the eastern United States. The emergence of these ticks represents a potential threat for livestock, wildlife, and human health. We describe the distribution, host-seeking phenology, and host and habitat associations of these ticks on Staten Island, New York, a borough of New York City. Tufts DM, Emerg Infect Dis. 2019 Apr. [https://wwwnc.cdc.gov/eid/article/25/4/18-1541\\_article](https://wwwnc.cdc.gov/eid/article/25/4/18-1541_article). Article free at doi link.

## International & General Section

### Map showing people with alpha gal (self-pinning)

[www.zeemaps.com/map?group=555038](http://www.zeemaps.com/map?group=555038)



## **The Controversies, Challenges and Complexities of Lyme Disease: A Narrative Review.**

Lyme disease has become an increasingly important global public health concern. A narrative review was conducted and designed to present a broad perspective on Lyme disease, and describe its history and development in terms of clinical care and public health implications. A structured literature search was conducted based on the question; what is currently known about Lyme disease?...

Despite growing global incidence of the Lyme disease, treatment has not attracted pharmaceutical investment, and the evidence base and international guidelines for treatment and management of chronic Lyme continue to be conflicting and controversial. The challenges of this immune mediated tickborne disease for public health policy and clinical practice are summarized, alongside directions for future research. Van Hout. [J Pharm Pharm Sci](https://www.ncbi.nlm.nih.gov/pubmed/30458921). 2018;21(1):429-436. <https://www.ncbi.nlm.nih.gov/pubmed/30458921>

## **US spends more on health care, has lower life expectancy, higher infant mortality**

### **Health Care Spending in the United States and Other High-Income Countries**

**Question** Why is health care spending in the United States so much greater than in other high-income countries?

Data were compared with: United Kingdom, Canada, Germany, Australia, Japan, Sweden, France, the Netherlands, Switzerland, and Denmark.

### **Findings (2016)**

- the US spent 17.8% of its gross domestic product on health care
- other countries ranged from 9.6% (Australia) to 12.4% (Switzerland)
- proportion of the population with health insurance was 90% in the US, other countries were 99%-100%
- the US had the highest percentage of adults who were overweight or obese at 70.1% (mean for the 11 other countries, 55.6%)
- life expectancy in the US was the lowest of the 11 countries
  - 78.8 years (range for other countries, 80.7-83.9 years; mean of all 11 countries, 81.7 years)
  - infant mortality was the highest (5.8 deaths per 1000 live births in the US; 3.6 per 1000 for all 11 countries)
- pharmaceutical costs, spending per capita was \$1443 in the US vs a range of \$466 to \$939 in other countries

**Conclusions and Relevance.** The United States spent approximately twice as much as other high-income countries on medical care, yet utilization rates in the United States were largely similar to those in other nations. Prices of labor and goods, including pharmaceuticals, and administrative costs appeared to be the major drivers of the difference in overall cost between the United States and other high-income countries. As patients, physicians, policy makers, and legislators actively debate the future of the US health system, data such as these are needed to inform policy decisions.

**Meaning.** Efforts targeting utilization alone are unlikely to reduce the growth in health care spending in the United States; a more concerted effort to reduce prices and administrative costs is likely needed. Papanicolas et al. <https://jamanetwork.com/journals/jama/article-abstract/2674671>

## **Lyme disease rapidly emerging in parts of central and eastern Canada**

### **Lyme Disease Emergence after Invasion of the Blacklegged Tick, *Ixodes scapularis*, Ontario, Canada, 2010–2016**

Lyme disease (LD) is the most reported vectorborne disease in North America, where it is caused by *Borrelia burgdorferi* sensu stricto and principally transmitted by the blacklegged tick (*Ixodes scapularis*) ([1](#)). With northward expansion of *I. scapularis* tick populations from endemic areas in the United States, LD is rapidly emerging in parts of central and eastern Canada. Although several studies have mapped blacklegged tick populations across Canada and developed models to predict future spread of ticks and LD risk, little is known about the extent of human LD in relation to tick vector distributions at a fine geographic scale. We examined spatiotemporal trends in the occurrence and expansion of *I. scapularis* ticks, *B. burgdorferi*-infected ticks, and human LD cases over a 7-year period to elucidate the process of LD emergence in eastern Ontario, Canada. Kulkarni, et al. (2019). *Emerging Infectious Diseases*, 25(2), 328-332. <https://dx.doi.org/10.3201/eid2502.180771>. Entire article free at: [wwwnc.cdc.gov/eid/article/25/2/18-0771\\_article](http://wwwnc.cdc.gov/eid/article/25/2/18-0771_article).

## **Lyme disease is present in Mexico**

### **Lyme Neuroborreliosis is a Severe and Frequent Neurological Disease in Mexico**

Patients with neurological manifestation (cranial neuritis, radiculoneuritis, meningitis and encephalomyelitis) were recruited in one pediatric and two general hospitals, during January 2006–December 2015. Blood and cerebrospinal fluid (CSF) samples were drawn from each patient at inclusion. IgM and IgG antibodies against *B. burgdorferi* were detected using a commercial ELISA test, and confirmed by Western-Blot test (WB) using three different antigens from *Borrelia burgdorferi* complex. Following CDC criteria were considered true cases with both positive tests.

Of 606 patients recruited, 403 (66.5%) were adults and 203 (33.4%) children, 50.5% were male. *B. burgdorferi* infection was diagnosed in 168 patients (27.7%), 97 adults, mean age  $42 \pm 14.7$  years and 71 children, mean age  $9.6 \pm 5$  years; early disseminated disease occurred in 130 cases (77.4 %) and chronic stage in 38 (22.6 %).

A previous tick bite was reported by 21% cases, and 5% recalled an erythema migrans lesion. Polyradiculoneuropathy and encephalomyelitis were the most common manifestations, whereas 14.8% presented an initial Guillain-Barré Syndrome. *B. burgdorferi* sensu stricto was identified in 142 (84%) cases, *B. garinii* in 14 (8%), *B. afzelii* in three, and nine cases presented coinfection with two species. Lyme neuroborreliosis is a frequent condition in patients with neurological diseases in Mexico. Gordillo-Pérez et al. Archives of Medical Research, <https://www.ncbi.nlm.nih.gov/pubmed/30554857>

## Certain birds may spread tick-borne diseases in Europe

### Screening for multiple tick-borne pathogens in *Ixodes Ricinus* ticks from birds in Denmark during spring and autumn migration seasons

Presently, it is uncertain to what extent seasonal migrating birds contribute to the introduction of ticks and tick-associated pathogens in Denmark...

Bird-derived ticks were identified to tick species and screened for 37 tick-borne pathogens using real-time PCR. Overall, 807 birds, representing 44 bird species, were captured and examined for ticks during the spring (292 birds) and autumn migrations (515 birds). 10.7% of the birds harboured a total of 179 *Ixodes ricinus* ticks. The European robin, the common blackbird, and the common redstart had the highest infestation intensities.

60.9% of the ticks were PCR-positive for at least one tick-borne pathogen. *Borrelia* DNA was found in 36.9% of the ticks. The *Borrelia* species detected were *B. spielmanii* (15.1%), *B. valaisiana* (13.4%), *B. garinii* (12.3%), *B. burgdorferi* s.s. (2.2%), *B. miyamotoi* (1.1%), and *B. afzelii* (0.6%). In addition, 10.6% and 1.7% of the samples were PCR-positive for spotted fever group *rickettsiae* and *Candidatus* *Neorhlichia mikurensis*.

... Our study indicates that migrating birds can transport ticks and their pathogens from neighboring countries to Denmark including sites in Denmark without a sustainable tick population.... Klitgaard K, et al. Ticks and Tick-borne Diseases. [doi.org/10.1016/j.ttbdis.2019.01.007](https://doi.org/10.1016/j.ttbdis.2019.01.007)

### Advertisement



#### About Insect Shield Technology:

Insect Shield's EPA-registered technology converts clothing and gear into effective and convenient insect protection. The repellency is long-lasting and appropriate for use by the entire family with no restrictions for use.

#### Quick Facts:

- Repellency is in the clothing and gear – not on your skin
- Lasts through 70 launderings
- EPA-registered
- No restrictions for use
- Appropriate for the entire family
- No need to re-apply
- Repels mosquitoes, ticks, ants, flies, chigger and midges including those that can cause Lyme disease, malaria and other dangerous insect-borne diseases

[www.insectshield.com](http://www.insectshield.com)

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<https://www.insectshield.com/IS-Your-Own-Clothes-P338.aspx>



*TIC-NC is grateful for the financial contributions of Insect Shield International, LLC.*

*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. It is easy to join (free) and donate. Go to: <http://tic-nc.org/joindonate/> Thank you for your support.*

#### **Board**

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#### **Disclaimer**

TIC-NC's newsletter content, including text, graphics, images and information is for general informational purposes only. The contents are not intended to be a substitute for professional medical advice, diagnosis or treatment.

Any contact information is provided for you to learn about tick borne illnesses and related issues. Our organization is not responsible for the content of other material or for actions as a result of opinions or information expressed which may appear from time to time.

It is the responsibility of you as an individual to evaluate the usefulness, completeness or accuracy of any information you read and to seek the services of a competent medical professional of your choosing if you need medical care.

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