



**BEBOP LABS**

# Newsletter

SPRING 2020

## THE STATE OF TICKS AND TICK-BORNE DISEASES IN NH

### BeBop Labs' Mission

BeBop Labs' is to research, gather, and disseminate scientific data and knowledge to the public on impacts to health and environment, and supply public access to a collaborative science laboratory to educate, invent, and empower local individuals.

### BeBop Labs' Vision

BeBop Labs' vision is to create and foster a scientifically-minded community that actively works together to tackle issues affecting human health and our environment.

### BeBop Labs' Status

We are a 501(c)3 organization.

### THE TICK PROJECT



### NH is Highest in Risk but Lowest in Assistance

- Tick-borne diseases (TBD) have increased by 300% in New England over the last 25 years. NH is one of the top states, yet the last cases were reported six years ago at 1,415, only reporting clinical Lyme disease, which the CDC estimates 8-12 times under reported.
- Within our community NH Health Wisdom, part of the Bureau of Infectious Disease Control, indicates that the average rate of clinical Lyme disease cases has doubled from 2005-2009 (average rate is 28) to 2010-2014 (average rate is 56). NH Health Wisdom data does not track the other 17 tick-borne diseases, but BeBop Labs does.
- As it is hard to re-define a clinical definition of Lyme disease, which is based on a 2-tier diagnosis (60-80% accurate test, diagnostic tests are changing but not yet in NH), one method to expand our knowledge is to increase tick surveillance, testing ticks for disease (99.99% accurate test and does multiple diseases at one time).
- NH remains lowest in federal allocated funds for TBD.



### Find Out More Information About Us

 [BebopLabs.org](https://BebopLabs.org)

 [BebopLabsNH@gmail.com](mailto:BebopLabsNH@gmail.com)

 [www.facebook.com/BebopLabs](https://www.facebook.com/BebopLabs)

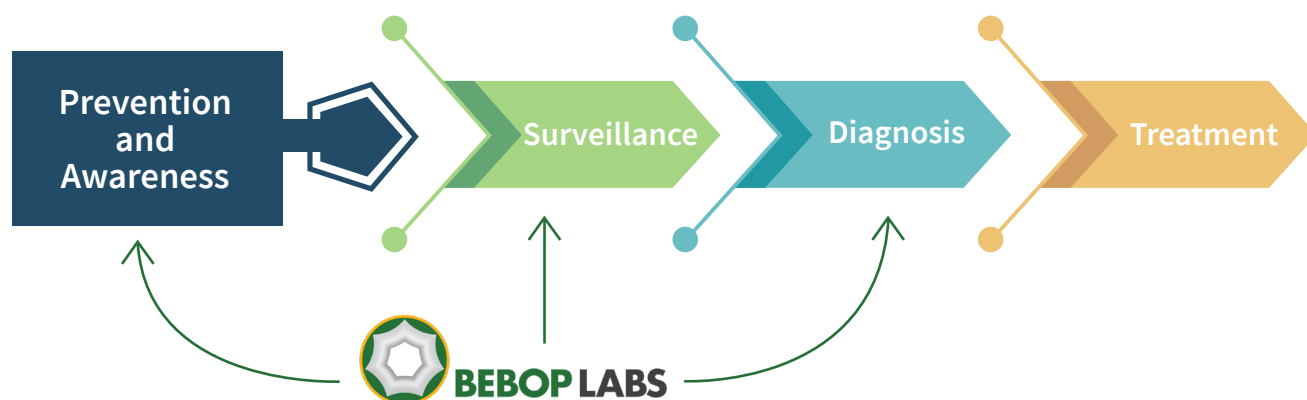


**BEBOP LABS**

*Newsletter*

SPRING 2020

## Overview of the Tick and TBD Issue



BeBop Labs is the only organization in NH that tracks ticks and tick-borne diseases. Thus our organization is part of Prevention and Awareness, Surveillance, and Diagnosis. All of our efforts are because of the help of citizen scientists. With the changing climate it is now a necessity to continually track our risk of tick-borne diseases especially in our northern and underserved state of New Hampshire.

**We are the only organization  
in NH currently tracking ticks  
and tick-borne diseases.**

## What BeBop Labs Does

- Creating an interactive tick distribution map throughout New Hampshire
- Identifying infected ticks in your area
- Accurately mapping risk areas
- Educating the public about ticks and tick-borne diseases
- Notifying the public about specific at risk areas

## BeBop Labs' Current Goal

- To see a sign at every park and trail head notifying an individual about the risk of getting bitten by an infected tick. And informing the individual about mitigations to decrease the risk.

## Participate in our Survey

You can also help us collect data on your behaviors and understandings by taking our survey. Available on our website through a link or a printable PDF that can be mailed. This will help us direct the research and educational fliers so we answer your questions. [www.BebopLabs.org/tick-survey](http://www.BebopLabs.org/tick-survey)



[BebopLabs.org](http://BebopLabs.org)



[BebopLabsNH@gmail.com](mailto:BebopLabsNH@gmail.com)

P.O. Box 183 | Salisbury, NH 03268

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SPRING 2020

## BeBop Labs Crowdsources for Ticks

Put tick in zip-lock bag or tape and mail it with the following info to:

**BeBop Labs**  
**Tick Collection**  
**PO Box 183**  
**Salisbury, NH 03268**

*Please note we have changed our address*

### TICK COLLECTION QUESTIONS

**DATE** tick was found.

**NUMBER** of ticks found.

**LOCATION** tick was found.

**ACTIVITY** during tick discovery.

**ON WHOM** tick was found (Human, pet)

**TICK BITING** or **CRAWLING**.

If **BITING**, where on person/pet.

If **BITING** human, age of person.



## Citizen Science

By saving a tick you directly participate in the collection of the data which makes finding answers to your questions and the results possible.

### Citizen Scientists

- Because of our citizen scientist project we have engaged 80,000 people, 10,000 actively gather ticks in NH.
- We have empowered all ages to take charge of their own health and increased awareness about ticks and tick-borne diseases throughout the entire state of NH (and many other states and countries).
- And we have been on the front page of:
  - Daily Sun
  - Concord Monitor
  - Valley News
  - Seacoast Online
  - Non Profit Quarterly
  - Tech Times
- In 2018 we collected 1654 ticks 822 tested for disease
- In 2019 we collected 5820 ticks 1272 tested for disease

## Where our Ticks came from in 2019

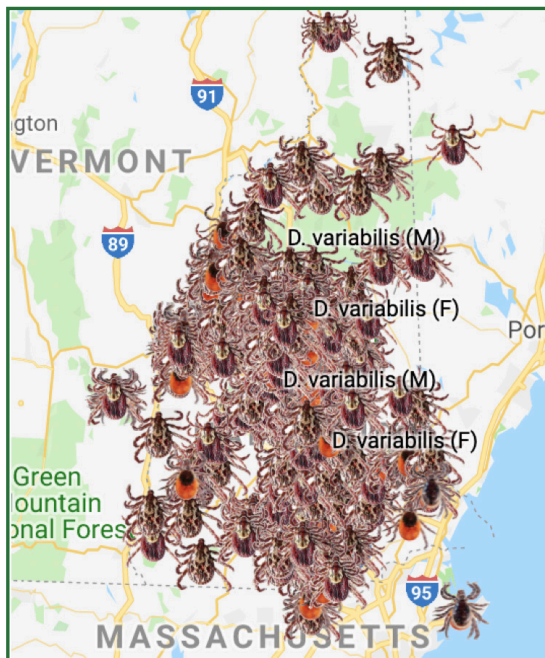
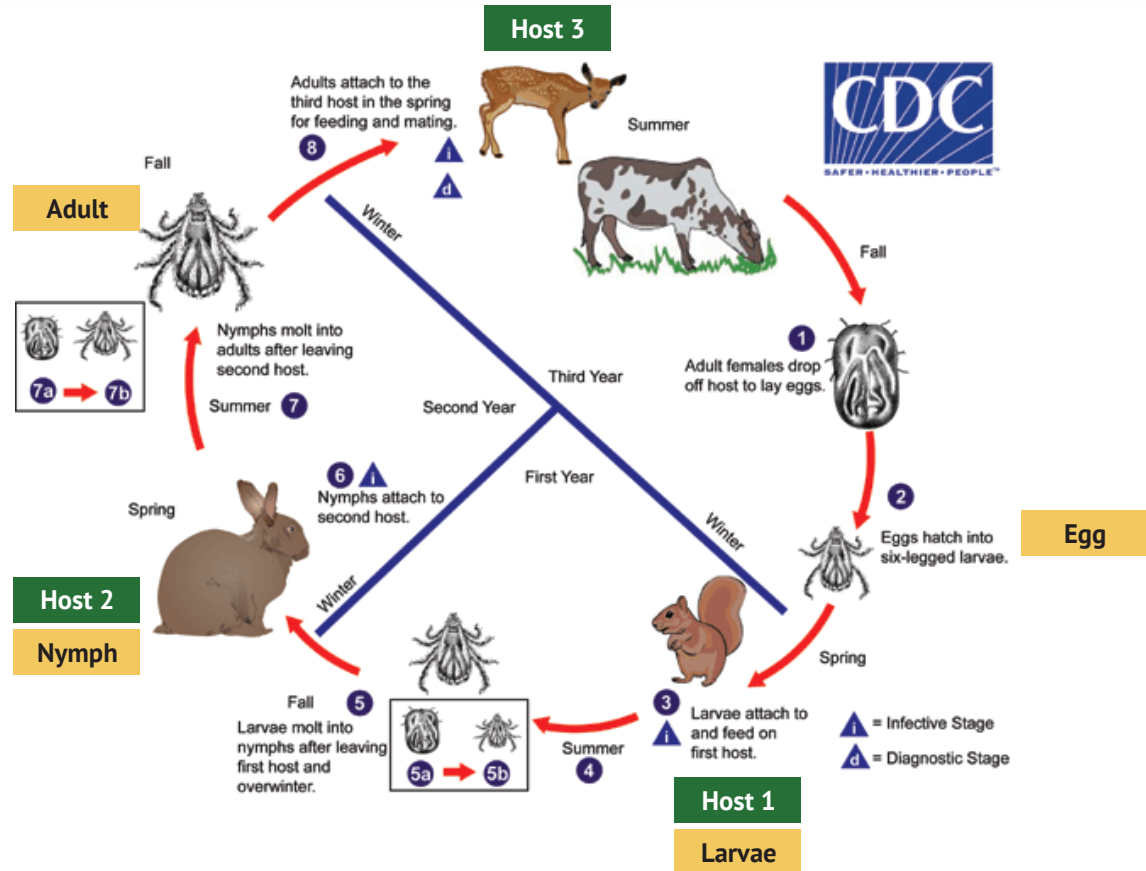
	Blacklegged Ticks (Deer Ticks)	Dog Ticks	Other
Total # collected from citizen scientists	1341	4443	36
Collected from SPNHF	1	64	0
Collected from NH Camps	1069	122	11
Collected at Schools	119	56	0
Total Tested for Disease	882	374	16
Total positive for disease	357	1	1
Total co-infected	44	0	0

[BebopLabs.org](https://BebopLabs.org)[BebopLabsNH@gmail.com](mailto:BebopLabsNH@gmail.com)

P.O. Box 183 | Salisbury, NH 03268



## BLACKLEGGED TICK LIFE CYCLE



## Where Ticks Are Located

Check out BeBop Labs interactive map.  
[BebopLabs.org/Mapping-Ticks](http://BebopLabs.org/Mapping-Ticks)







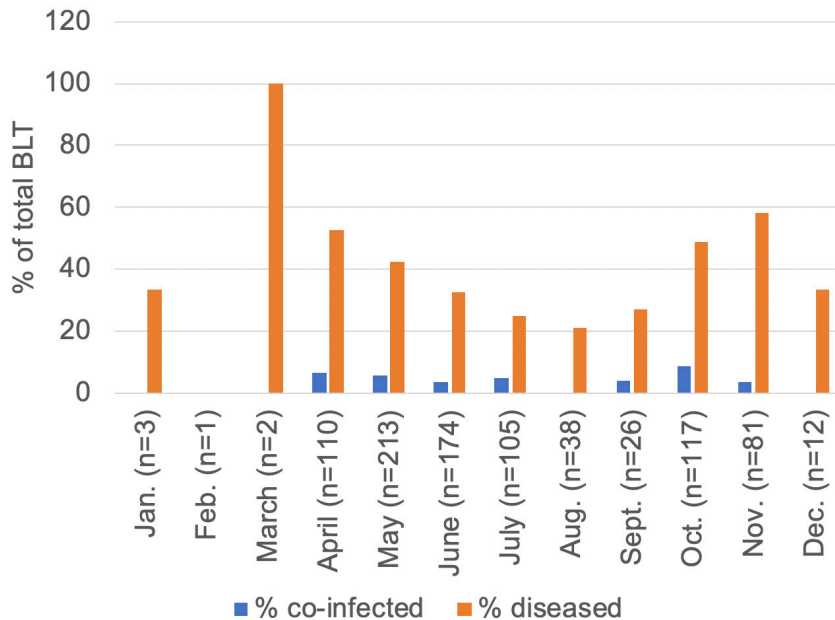
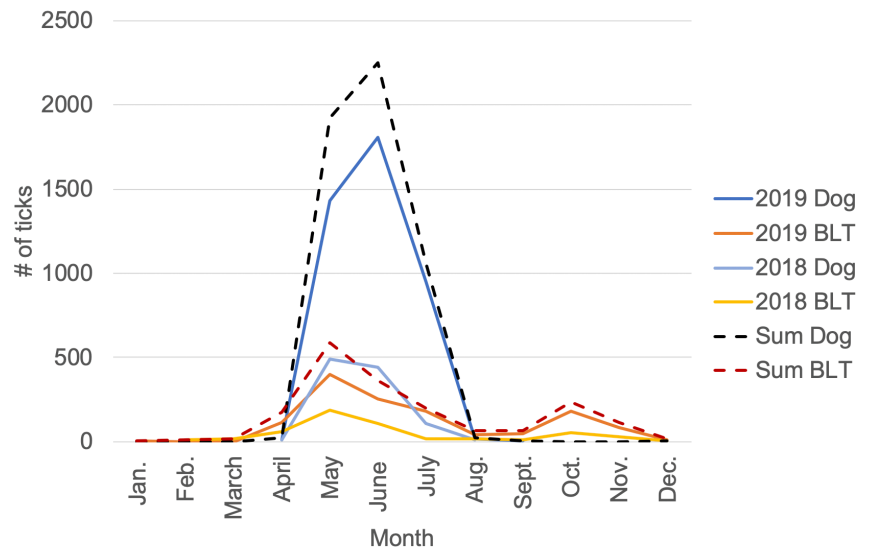
## What Time of Year Do You Find Ticks?

There is only 1 season for Dog ticks

- Spring-summer
- Peaks in June

There are 2 seasons for Blacklegged ticks (aka BLT and Deer ticks):

- Spring season peaks in May
- Fall season peaks in October
- We see BLT as early as March



## What Time of Year are most Blacklegged ticks (Deer ticks) Infected with Disease?

**There is a higher percentage of infected BLT in the fall than the spring.**

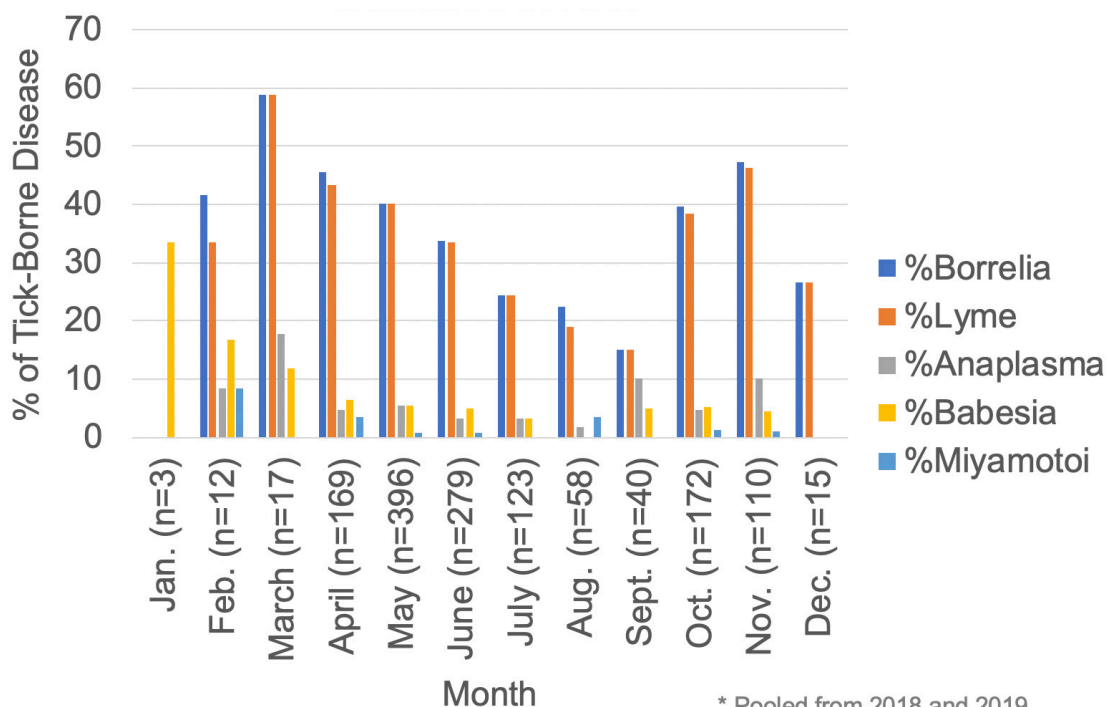
This conclusion is made excluding the information gathered Jan—March as numbers of ticks are so low.



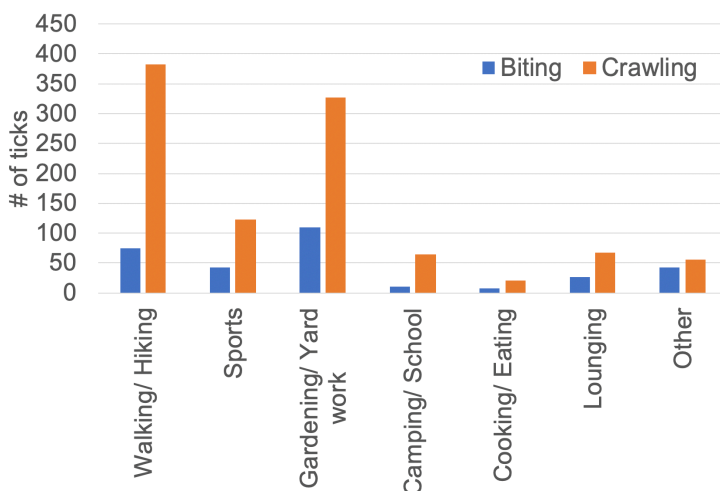


## What Time of Year do we Find Tick Borne Diseases in NH?\*

From analyzing 2018 data we made the conclusion that tick-borne diseases are steady all year round as we were unable to see a pattern in the data. Yet, when we combine our disease data from 2018 with 2019 we see that Lyme disease and Anaplasmosis has 2 seasons coinciding with the BLT seasons. Ticks harboring Babesiosis are higher in the spring, but the data could be too small to make definitive conclusion. And ticks that carry Miyamotoi have no noticeable patterns yet.



\* Pooled from 2018 and 2019

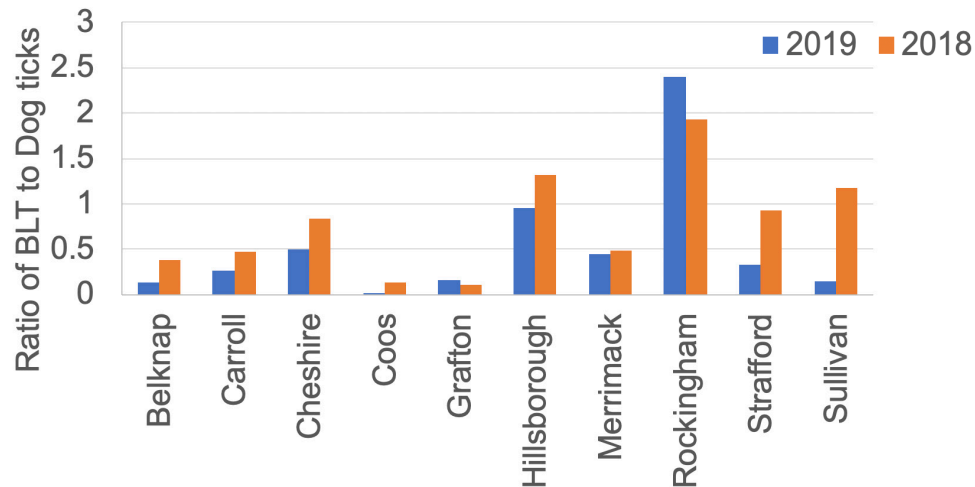


## At-Risk Activities for Humans

The highest at risk activity for biting ticks is gardening/ yard work and the highest at risk activity for a crawling tick is walking/ hiking.



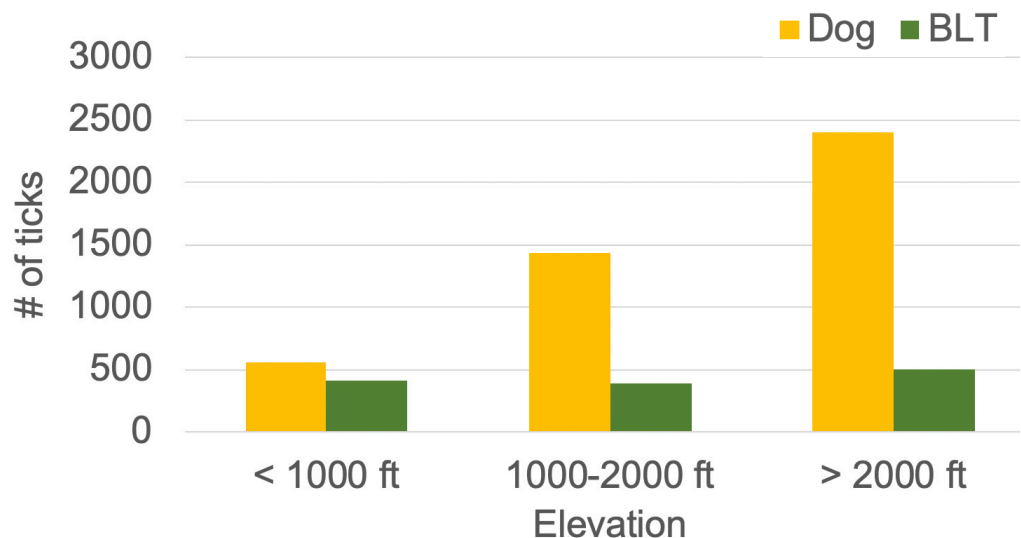
## Are There More Blacklegged Ticks South of Concord than There are North?



Because BeBop Labs crowdsources for ticks we normalized our data by creating a ratio of BLT to Dog ticks. We analyzed the ratios by NH county to maximize the numbers of ticks. By doing this we can see that Rockingham and Hillsborough counties have more BLT as compared to Dog ticks, ratios greater than 1. Belknap, Carroll, Coos, Grafton, Merrimack county have more Dog ticks than BLT, ratios less than 1. Cheshire, Strafford and Sullivan ticks are in between, we may need more data as the data is inconsistent from 2018 to 2019.

## At What Elevations do We Find Ticks?

The number of Dog ticks increases with elevation, but it appears that the numbers of Blacklegged Ticks (BLT) is the same throughout.



**Tick-Borne Diseases found by County in NH from 2018\***

NH County**	%Borrelia#	%Lyme	%Babesia	%Anaplasmosis	%Miyamotoi
Belknap (n=19)	47	47	0	5	0
Carroll (n=34)	47	47	0	6	0
Cheshire (n=40)	17.5	17.5	0	5	0
Coos (n=3)	0	0	0	0	0
Grafton (n=60)	40	38	2	3	5
Hillsborough (n=173)	42	42	9	9	0.5
Merrimack (n=48)	52	50	12.5	4	2
Rockingham (n=85)	25	25	12	6	1
Strafford (n=39)	46	38.5	5	8	8
Sullivan (n=13)	23	23	0	0	0
State of NH (n=514)	38	37	7	6	2

\*Data pooled from BeBop Labs, Ticknology and UMass Amherst Lab of Medical Zoology public database, NH 2018.

\*\*n represents total # tested ticks for the county.

#Percentages of blacklegged ticks (deer ticks) rounded to the nearest percent.

**TBD Found by County in 2019\***

NH County**	%Borrelia#	%Lyme	%Babesia	%Anaplasmosis	%Miyamotoi
Belknap (n=58)	40	40	3	5	0
Carroll (n=63)	35	35	6	3	0
Cheshire (n=99)	36	36	2	5	0
Coos (n=2)	0	0	0	0	0
Grafton (n=103)	38	38	3	3	0
Hillsborough (n=222)	32	32	5	5	2
Merrimack (n=92)	42	42	4	1	0
Rockingham (n=150)	35	34	5	3	2
Strafford (n=61)	38	36	3	5	2
Sullivan (n=21)	52	52	0	14	0
State of NH (n=871)	<b>37</b>	<b>36</b>	<b>4</b>	<b>4</b>	<b>1</b>

**Consistently BeBop Labs data from 2018 and 2019 show approximately 40% ticks from Belknap, Carroll, Grafton, and Strafford county carry Lyme disease.**

Visit our website for town information, and eventually, park information will be posted there when we have enough data.







### WHAT TO DO IF YOU FIND A TICK

Is the tick attached (biting)?

No Yes

Put tick in ziplock bag and mail to BeBop Labs along with answers to the following questionnaire.

#### TICK COLLECTION QUESTIONS

**DATE** tick was found.  
**NUMBER** of ticks found.  
**LOCATION** tick was found.  
**ACTIVITY** during tick discovery.  
On **WHOM** tick was found. (Human, pet)  
Whether tick was **BITING** or **CRAWLING**.  
If **BITING**, where on person/pet.  
If **BITING** human, age of person.

Mail to:  
BeBop Labs  
PO Box 183  
Salisbury, NH  
03268

Pull tick out of skin.

#### TICK REMOVAL



↑ Pull straight up.

According to the Center of Disease Control:

- Step 1:** Use fine-tipped tweezers or your fingers to grasp the tick as close to the skin's surface as possible. Make sure to get the mouth.
- Step 2:** Pull upward with steady, even pressure. Don't twist or jerk the tick, so that the tick remains in tact.
- Step 3:** Do not discard tick. Place tick in sealed bag for testing.

Is the tick a Blacklegged tick (aka Deer tick)?

No Yes

Are you worried about contracting a disease?

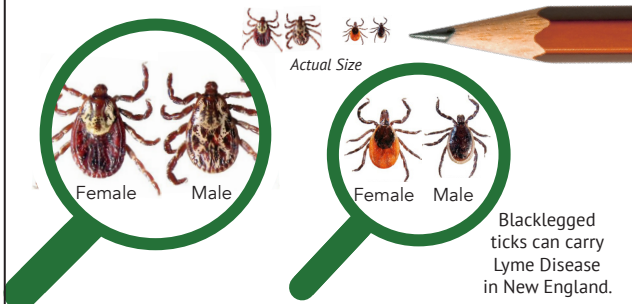
No Yes

For immediate disease carrying information, order a tick test for \$25 via Ticknology. [www.Ticknology.org](http://www.Ticknology.org)

#### IDENTIFYING TICKS

Dog Ticks  
*Dermacentor variabilis*

Blacklegged Ticks (Deer Ticks)  
*Ixodes scapularis*



Did the tick test positive for Lyme Disease?

No Yes



Move on with your life!

Consult with a Lyme-literate doctor





### Ticks Prefer:

- Tall Grass
- The area Between a Field and a Forest
- Leaf Debris
- Areas heavy with Mice or other small Rodents
- People who are Hot, Hairy, and Breathe heavy
- Hypothesis: Dog ticks prefer wet, marshy area



## CREATE A TICK-SAFE ZONE THROUGH LANDSCAPING

- |                      |   |                     |   |
|----------------------|---|---------------------|---|
| <b>1 MOW LAWN</b>    | Keep your lawn mowed.   | <b>4 WOOD CHIPS</b> | Make a perimeter with wood chips (cedar is best or pine) or spray like bifenthrin to protect the tick-free zone. But sprays also kill our bees. |
| <b>2 RAKE LEAVES</b> | Keep leaves raked and in a pile away from traffic. Leaves are where ticks lay their eggs.                 | <b>5 KEEP FERNS</b> | Leave ferns because they have a natural pesticide.  |
| <b>3 WOOD PILE</b>   | Put tick tubes on wood piles and stone walls where there are a lot of small rodents for ticks to feed on. |                     |   |



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SPRING 2020

## Prevention Tips

Now you know your risk of tick-borne diseases in your area. Try these proven prevention methods.

**1**

Wear long sleeve shirt and pants.

**2**

Spray clothes and shoes with permethrin spray.  
(0.5% Permethrin solution)

**3**

Wear white or light-colored clothes to see ticks easier.

**4**

Wear shoes/boots instead of sandals or barefeet.

**5**

Tie back long hair and wear a hat.

**6**

Walk in the middle of the trail, away from vegetation, where ticks quest.

**7**

Tuck shirt into pants and pants into socks or boots to help keep ticks away from your skin.

**8**

Perform daily tick checks. Send us any ticks you find. Instructions at [BebopLabs.org/sendticks](http://BebopLabs.org/sendticks).



Remember to Save Your Ticks!

Please Feel Free to Ask Questions and Make Suggestions

 [BebopLabs.org](http://BebopLabs.org)

 [BebopLabsNH@gmail.com](mailto:BebopLabsNH@gmail.com)

 [www.facebook.com/BebopLabs](https://www.facebook.com/BebopLabs)

**Donations help to fund research and solutions to prevent Lyme disease.**



Mapping risk of getting bitten by infected ticks, and informing the community of our findings.



Developing solutions to protect our moose from ticks that kill an increasing amount of moose each year.



Making a handheld device to provide onsite instantaneous disease information.



Empowering our community with knowledge of infected ticks, Lyme disease, its symptoms, and treatments.

**Donate Here:**  
[www.BebopLabs.org/donate](http://www.BebopLabs.org/donate)

**100% of donations** go directly to supporting our purpose. Your donation is **tax deductible**.

 [BebopLabs.org](http://BebopLabs.org)

 [BebopLabsNH@gmail.com](mailto:BebopLabsNH@gmail.com)

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