

# Tick-borne Diseases



**Presented by  
David Morrison**

# Vector-borne Diseases

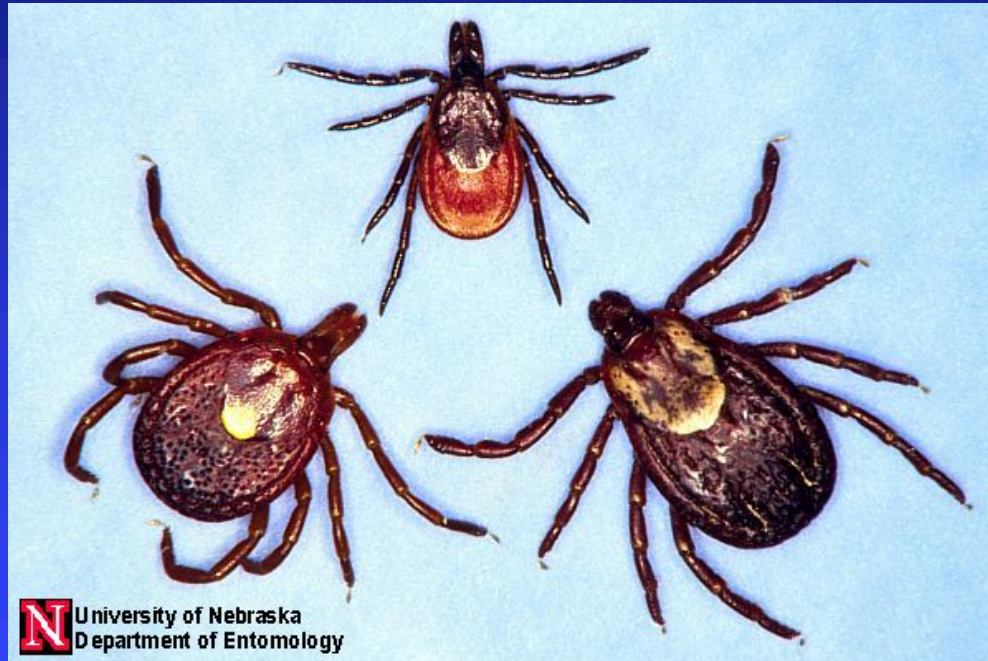
## *Introduction to tick-borne illness*

- An organism that carries a disease and can transmit it to another organism
- Ticks can be “vectors” of disease
- Biting is the mechanism of transmission
- Transmission is potentially the beginning of human infection

# Tick Species

*Three primary tick species*

Deer tick



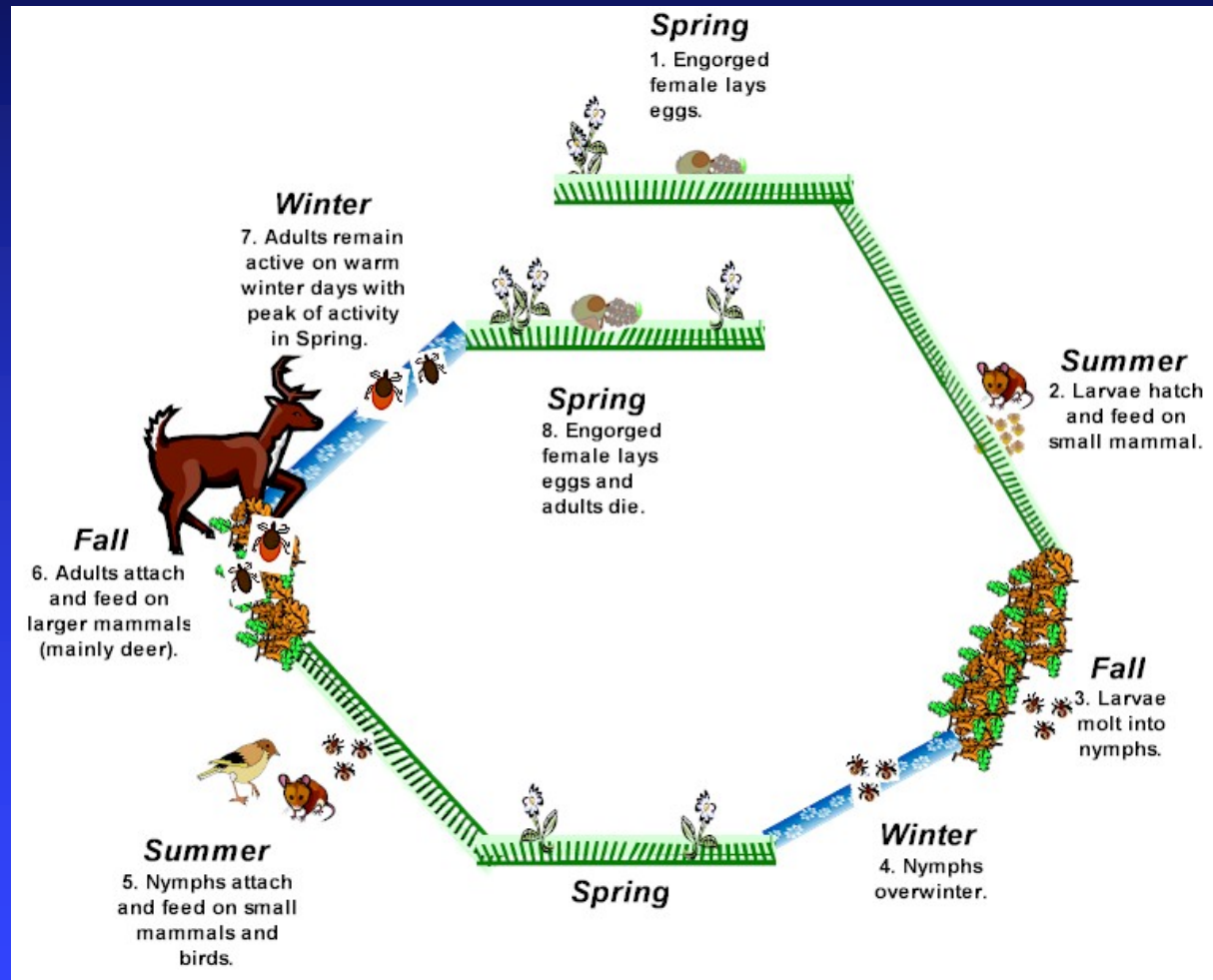
Lone Star  
Tick

Dog tick

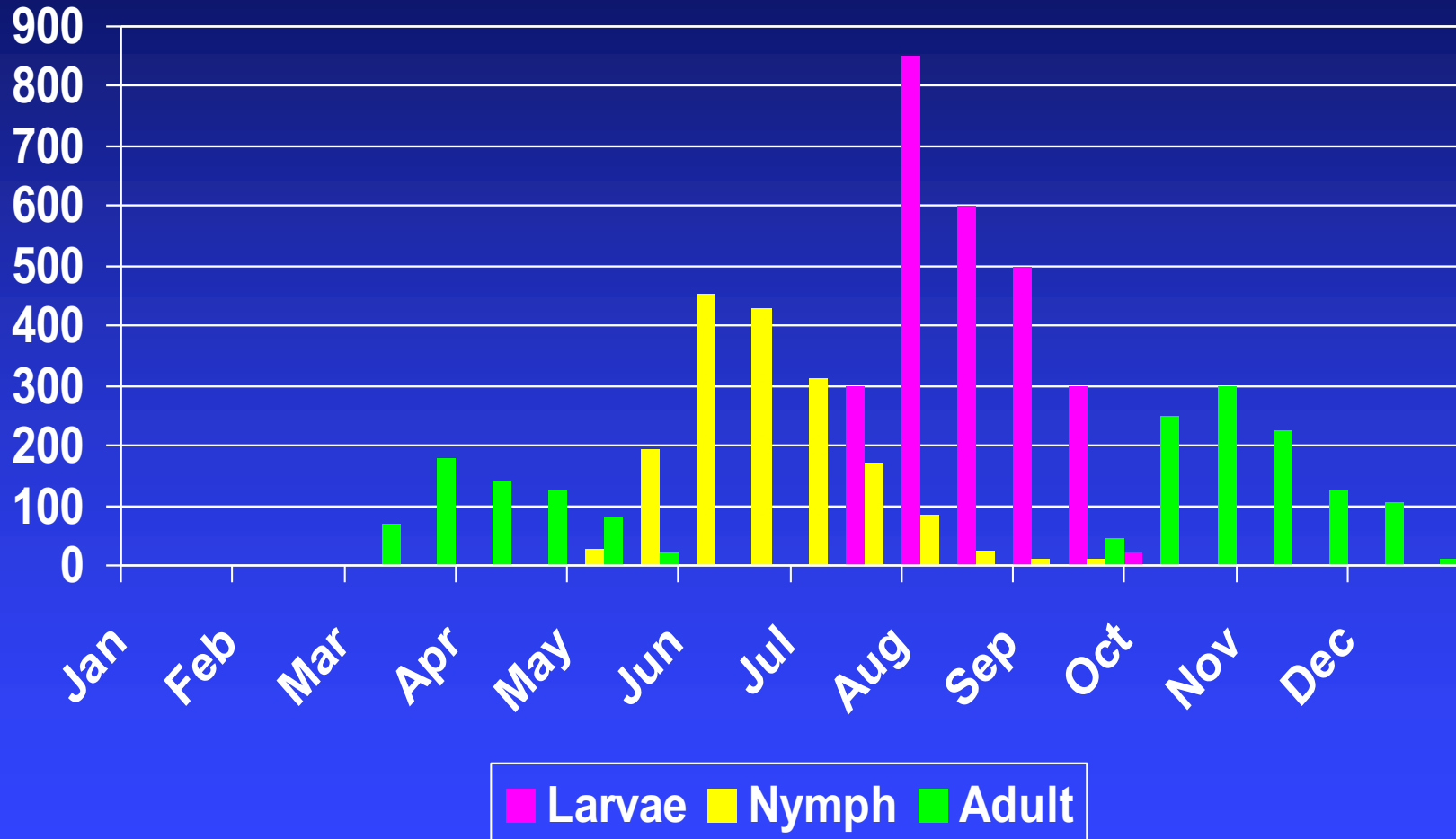
Photo: Department of Entomology, University of Nebraska-Lincoln - Jim Kalisch, UNL Entomology

# Tick Species

## Tick 2-year life cycle



# Number of Deer Ticks Collected by Life Stage





# Tick-borne Disease

Amoeba

Anaplasmosis - Anaplasma

Babesiosis - Babesia

Bartonellosis- Bartonella

Bartonella quintana (Trench  
Fever)

Borrelia miyamotoi (symptoms  
mimic Lyme)

Boutonneuse fever

Brucellosis- Brucella

Chlamydia Pneumonia

Colorado tick fever

Eastern tick-borne Rickettsiosis

Ehrlichiosis - Ehrlichia

Heartland Virus

Mycoplasmosis- Mycoplasma  
(symptoms mimic Lyme)

Powassan virus

Q Fever

Rocky Mountain spotted fever

STARI (symptoms mimic Lyme)

Tick Paralysis

Tick-borne encephalitis

Tickborne Relapsing Fever

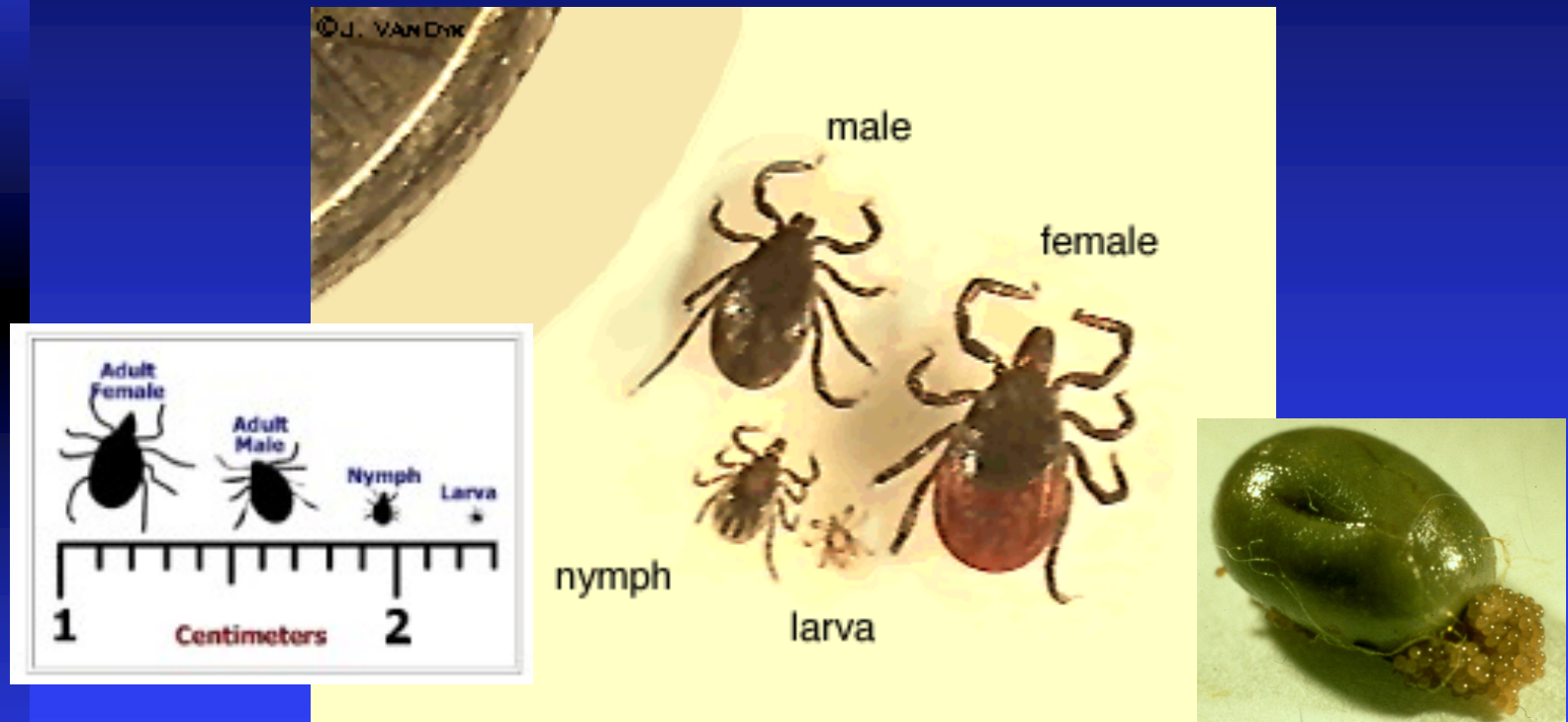
Treponema

Tularemia

Rickettsia phillipi

# Tick Species

*Deer tick (Ixodes scapularis)*



Notice the tear drop shape of the body.



# Tick Species

*Deer tick (Ixodes scapularis)*



Photo: Scott Bauer, USDA

# Lyme Disease

## *Introduction*



- Referenced over 400 years ago as an African brain parasite
- Recognized in Sweden early 1908
- Identified Lyme, CT in 1975
- Symptoms mimic many other illnesses
- Can attack various organ systems
  - ◆ Musculoskeletal
  - ◆ Neurologic
  - ◆ Cardiac

# Lyme Disease

## *Introduction*



- A bacterial infection caused by *Borrelia burgdorferi*



# Lyme Disease

## *Symptoms of early infection*



- Erythema migrans (expanding red rash)
- Fatigue, headache, stiff neck
- Pain or stiffness in muscles or joints
- Fever
- Swollen glands

# Lyme Disease

*Early localized infection*



Bull's eye



Multiple EM



John Hopkins University

# Lyme Disease

*Symptoms of disseminated infection*



- Lyme arthritis
- Bell's palsy, radiculoneuropathy, lymphocytic meningitis, or encephalitis
- 2nd or 3rd degree Atrioventricular block (Cardiac Rhythm)
- Multiple EM rashes

# Lyme Disease

*Disseminated infection*



## Lyme arthritis



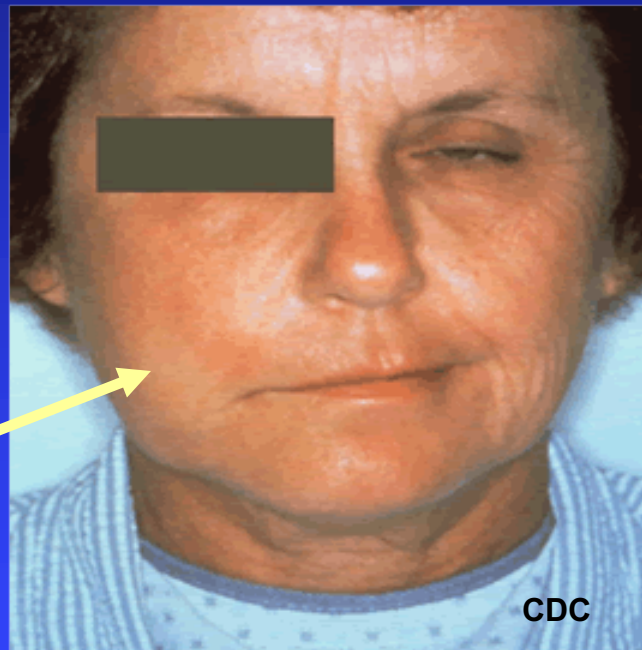
**Swollen knee**

# Lyme Disease

*Disseminated infection*



Neurologic



Bell's palsy

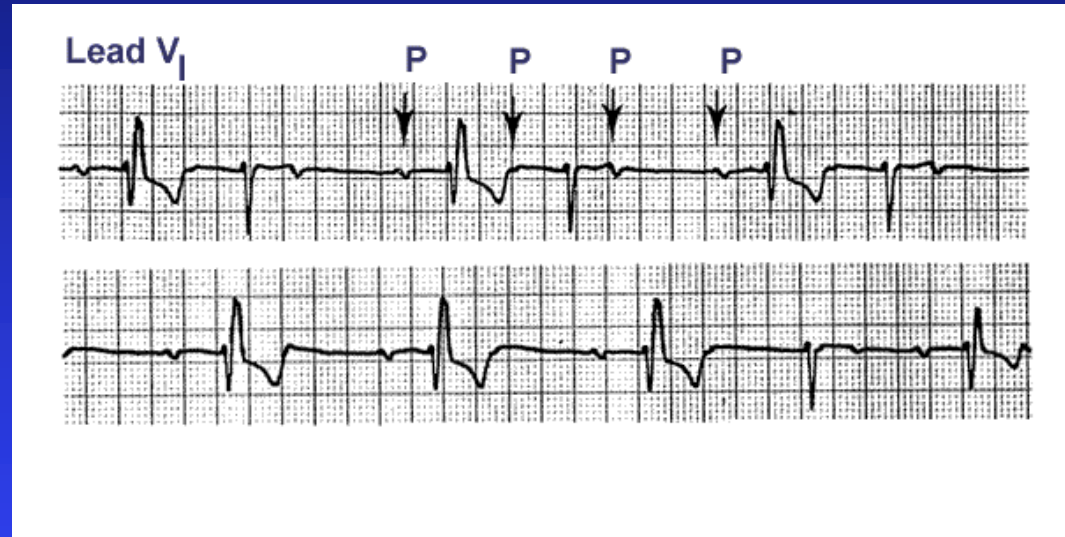


# Lyme Disease

*Disseminated infection*



## Cardiac



2<sup>nd</sup> degree  
AV block

# Lyme Disease

## *Other information*



- EM does not occur in the majority of those infected
- EM appears generally within 3-30 days after the bite
- About 60% of those infected who have not been treated experience arthritis several months after the bite
- Few of the untreated patients may develop chronic neurological complaints months to years after infection

# Lyme Disease

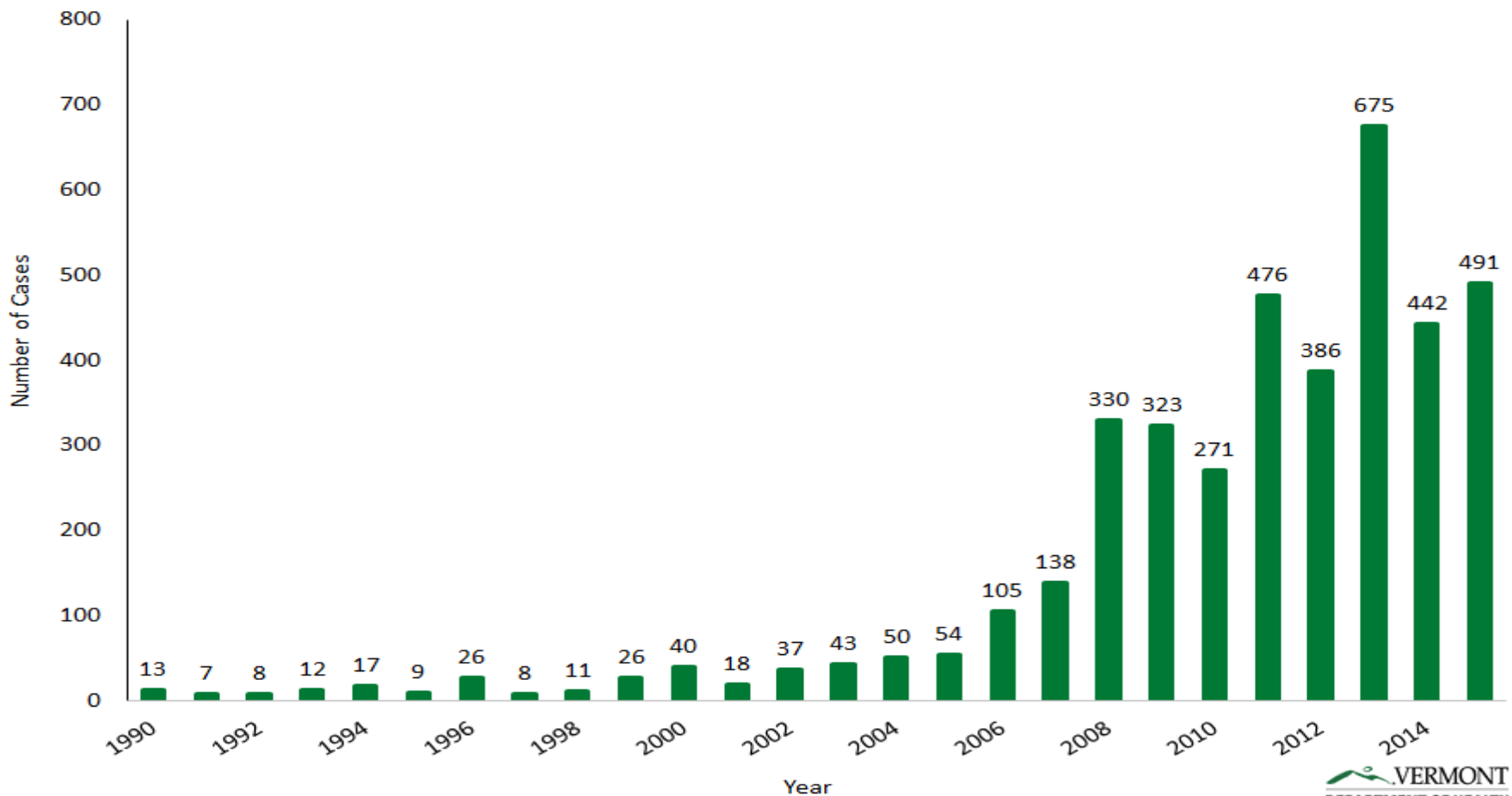
## *Other information*



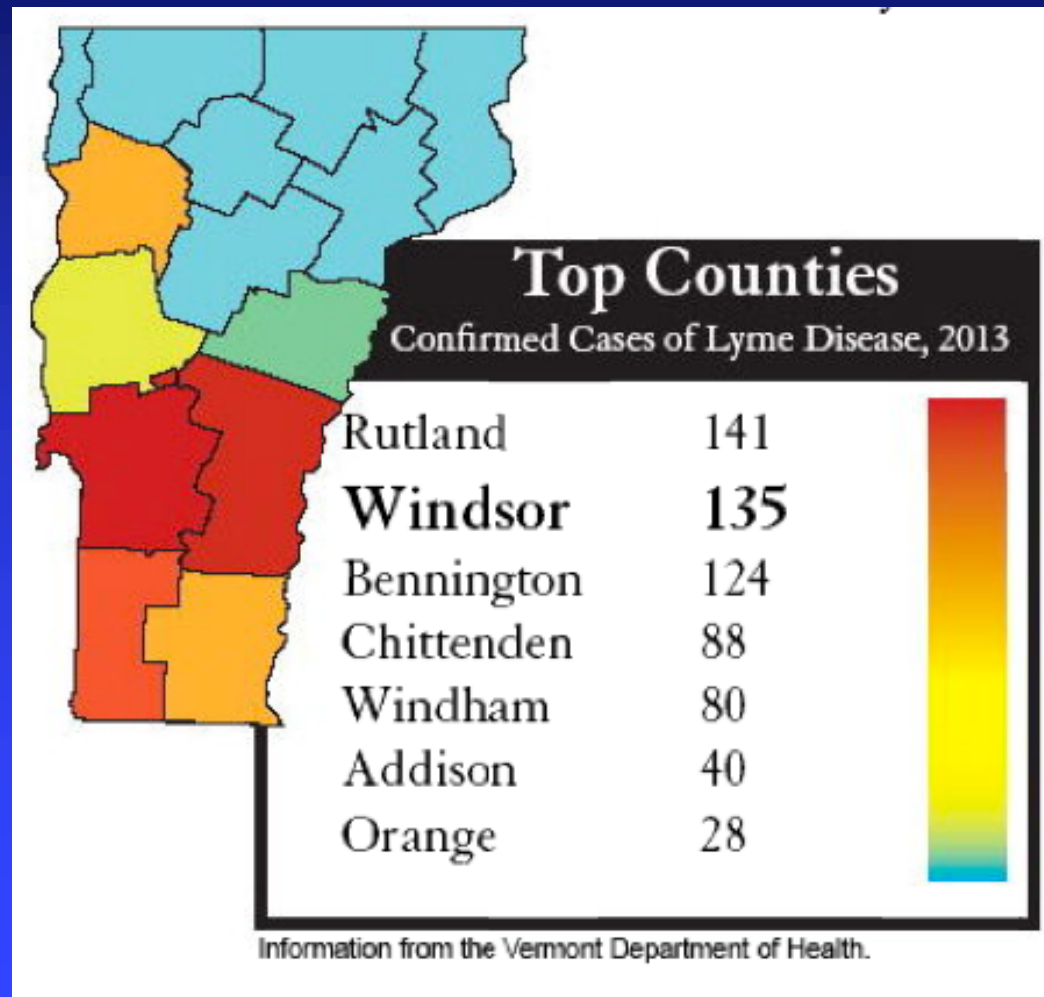
- Lyme disease symptoms may be more severe in patients who are co-infected with other tick-borne diseases
- Some cases can be cured with early antibiotic treatment
- Some patients may experience symptoms for months to years after delayed treatment
- Most cases are thought to be acquired in their own back yard

# Lyme Disease Cases Statewide Vermont 1990 – 2014

Number of Confirmed Lyme Disease Cases Reported to the Vermont Department of Health, 1990-2015



# Vermont number one per capita reported cases of Lyme disease



# Prevention Methods

*When in Wooded or Grassy Areas*

- Wear light colored clothing to spot ticks easier for faster removal
- Wear long pants
- Tuck pant leg into sock
- Wear closed toe shoes



# Prevention Methods

*When in Wooded or Grassy Areas*

- Use tick repellants containing DEET or permethrin (on clothing only)
- Protect your pets, ask your vet

# Prevention Methods

*DEET – Use with caution*

- DEET (N,N-diethyl-m-toluamide) is absorbed through the skin
- Use products with 30-40% DEET to be effective against tick bites
- Use according to label instructions
- Use sparingly
- Avoid prolonged and excessive use



# Prevention Methods

*DEET – Use with caution, cont.*

- Use on clothing when possible instead of skin
- Avoid inhaling or ingesting DEET
- Keep repellent out of eyes
- Avoid use on damaged skin (sunburn, cuts)
- After returning indoors, wash treated skin with soap and water

# Prevention Methods

## *Upon Returning Indoors*

- Check for ticks
- Inspect your body, your children, and pets
- Search through hair, around hairline
- Inspect body folds
- Remove ticks as soon as possible



# Tick Removal

- Do not use tweezers!
- Tic Twister
- Petroleum Jelly



# **Best Tick Removal**

# Tick Removal

- Avoid rupturing the tick body
- Wash and disinfect bite area



# After Removing Tick

- **Seek medical attention immediately from a Lyme Literate Doctor...not your primary or the ER!!!!!!**

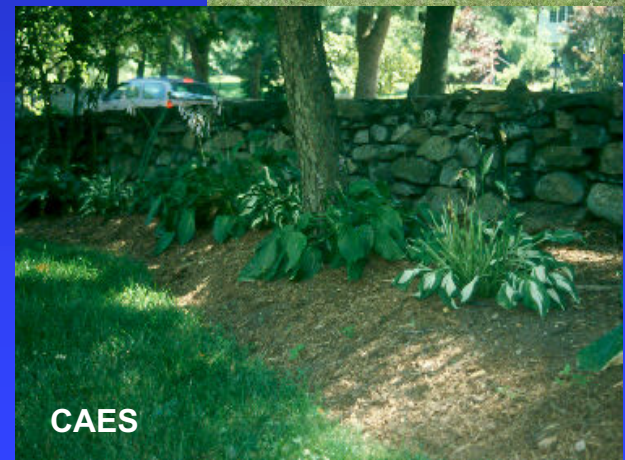
# Tick Control Measures

## *For Your Yard - Maintenance*

- Mow the lawn regularly
- Remove leaves and brush from yard and lawn edge
- Reduce groundcover
- Move bird feeders away from house
- Use pesticides



S. Perlotto



CAES

# Remember

*Tick-borne disease prevention check list.*

- Prevent tick bites
- Do daily tick checks
- Know all the symptoms of tick-borne diseases
- Learn to recognize the EM rash
- Modify your yard as necessary



# Remember

*Stay away from tick infested areas*

- When hiking, stay on trails, do not bushwhack
- Avoid fields with tall grass
- Stay clear of the transition area between the lawn and woodland edge

# Remember

*Tick-borne disease treatment.*

- **Call your doctor and seek early diagnosis and treatment**
- **You may need to be tested for several tick-borne diseases for an accurate diagnosis**
- **Take all medications prescribed**

# Remember

## *Tick Activity*

- Ticks are most active in spring and summer
- Ticks can feed during any season
- Check for ticks and watch for symptoms ALL YEAR

# Remember

*Tick-borne disease is preventable*

*Being aware of the dangers of tick-borne diseases and following the precautions recommended can greatly reduce your chances of becoming infected with Lyme disease, and or its co-infections!*