

North Carolina, Chatham County and Ticks



Chatham County Board of Health
March 2016

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NC: Deaths Mosquito versus Tick 1999-2007

NC Pest Management Section dismantled in 2011

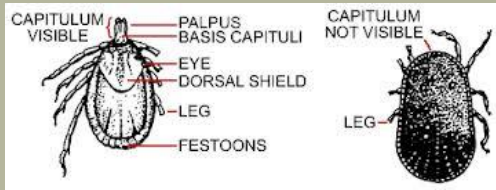


- Mosquito-borne infections: 3
West Nile (1) and mosquito-borne viral encephalitis (2)



- Tick-borne infections: 10
Lyme disease (1)
RMSF (9) (NC had highest #s of deaths in US, 1999-2010)

Source: CDC, National Center for Health Statistics. Compressed Mortality File 1999-2009, accessed Apr 13, 2011. Accessed Feb 2012 Stats on <10 deaths are no longer available for public use.



What is a tick?

○ It is not an insect!

- They are arachnids
- Comprise 100s of species, hard and soft types
- Larva have 6 legs, adults 8
- Feed on blood of mammals, birds, and reptiles
- 3 stages of development: larva, nymph, and adult
- Vector bacteria, viruses, & protozoa

○ Distribution- worldwide



Ex- distribution of Ixodes

Map courtesy of Alan
McDonald, MD

Tick Identification

(ADULT) FEMALE LONE STAR-

- The *only* tick an untrained person can identify

“TINY” TICK DOES **NOT** EQUAL A “DEER” TICK

- “Tiny” ticks are larva or nymphs of any species of ticks



Image courtesy of the CDC

Amblyomma americanum
Lone Star tick



How do they bite?

Dermacentor variabilis
American Dog tick



Ixodes scapularis
Blacklegged tick (Deer tick)



Rhipicephalus sanguineus
Brown Dog tick



Amblyomma maculatum
Gulf Coast tick

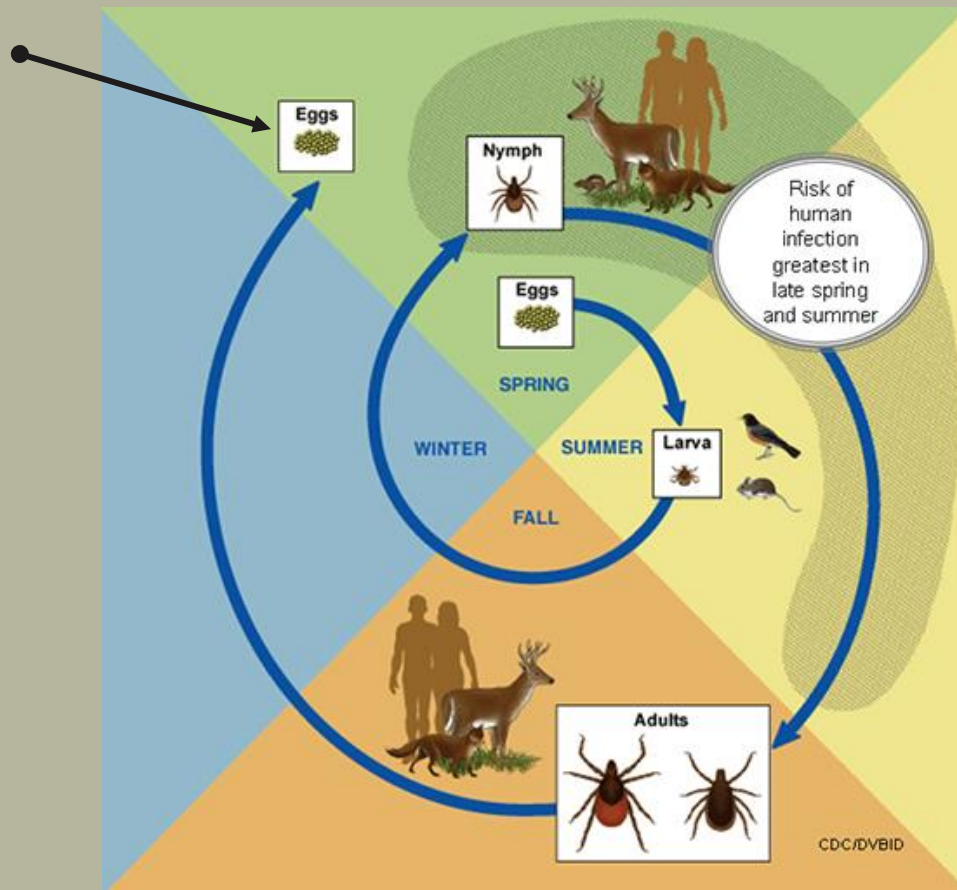


Saliva secrets :

- anesthetic
- attachment cement
- anticoagulant

Tick Life Cycle

May be infected with certain diseases



This cycle takes place over two or three years.

Each stage has season(s) in which they are most likely to be active.

Deer = ticks

Primarily lone stars and black-legged ticks feed on deer



Adults of these species require a large mammal to reproduce



Tick-borne Disease Emergence in the U.S.

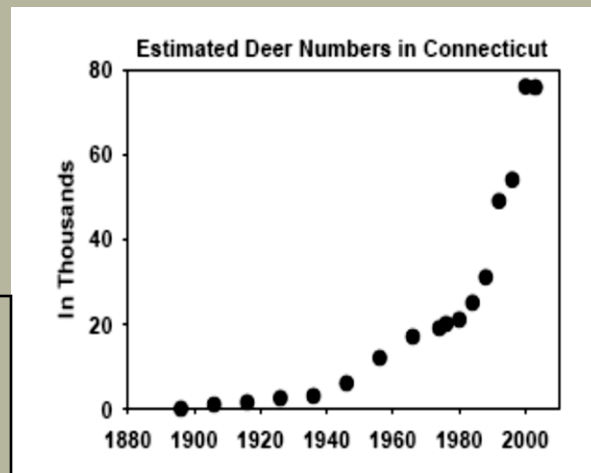


Source:

Bald hills: New England before the trees returned.
From *Thoreau's Country*.

American Scientist Online

[Http://www.americanscientist.org](http://www.americanscientist.org)



Source: K. Stafford, CT Agricultural Experiment Station, Courtesy of the CDC

- Reforestation
- Overabundant deer populations
- Increased numbers of ticks
- Expansion of suburbia into wooded areas
- Increased exposure opportunities

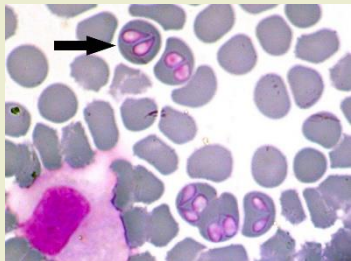
NC has about 25 species of ticks of which **5 bite humans**



US distribution of the 5 tick species that bite humans in NC
All carry multiple diseases...

Maps courtesy of the CDC

NC Ticks, Pathogens, and Problems (known to date)



Reportable TBIs in NC

Spotted fever rickettsioses (RMSF)

Ehrlichias

Lyme disease

Anaplasma

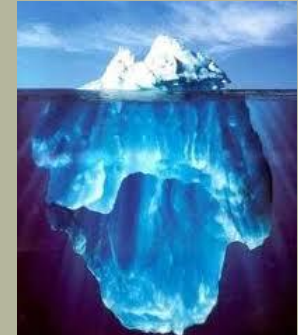
Babesiosis

Tularemia

Q Fever (*Coxiella burnetii*)

2015 NC TBIs, probable/confirmed

Lyme disease	229/36
SFR (includes RMSF)	462/5
Ehrlichia	75/16
Anaplasma	20/4



6 Lyme endemic counties in NC:

Wake, Guilford, Haywood, Alleghany, Wilkes, Buncombe

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)

Non-reportable tick-borne infections and conditions

- Tick paralysis
- STARI (Southern Tick-Associated Rash Illness)
- *R. amblyommii* (?pathogen)
- *Babesia microti* (not yet found in NC)
- *Borrelia miyamotoi* (not yet found in human in NC)
- Powassen virus (not yet reported in NC)
- *Rickettsia parkeri* (may get under SFR) →
- Heartland virus (NC?)
- Bourbon virus- discovered 2014 (NC?)
- Long Island tick virus- discovered 2014 (NC?)
- Red meat and cetuximab allergy

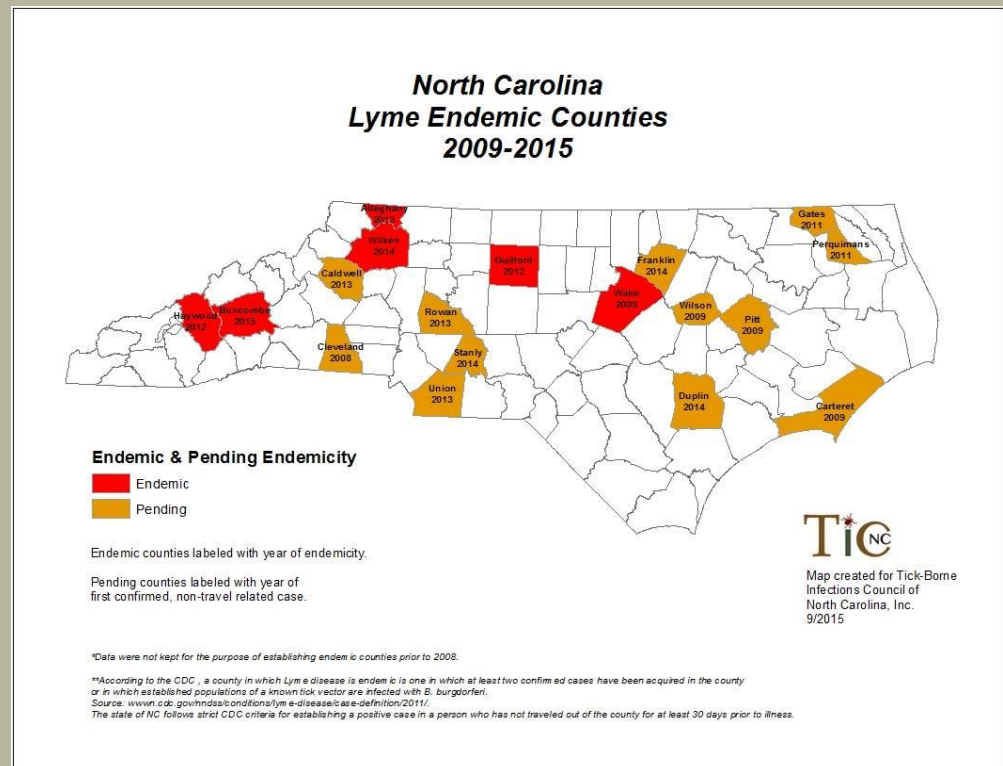


Lyme disease in North Carolina

- Wake, Haywood, Guilford, Allegheny, Wilkes, Buncombe:

- ENDEMIC**

- Endemic- def:
- 2 CDC confirmed cases within a county in persons not leaving county for 30 days prior to exp



Erythema migrans

- Lyme: 20-40% do NOT develop EM
- 'Bull's eye' is a misnomer
 - More rashes are solid than not
- No data for proportion with EM in STARI
- Lyme vs STARI EMs: cannot be distinguished
- EM rashes have many appearances



EM rash, post black-legged tick bite



EM rash, 11 days post lone star bite



Initial Symptoms of a Tick-borne Illness

- > 1 infection may be transmitted (co-infections)
- Early symptoms (up to 30 days or so)
 - Rashes, though often none
 - Fever, may be low-grade
 - Headache
 - Muscle aches, fatigue
 - Joint aches and pains
 - Other
 - May range from very mild to very severe

Treatment should usually not wait for tests.
Tests are usually negative in the 1st week or two.

Teach How to Remove Ticks: Not This Way!



Disease transmission may occur from tick feces or fluids.

Do not touch with bare hands.

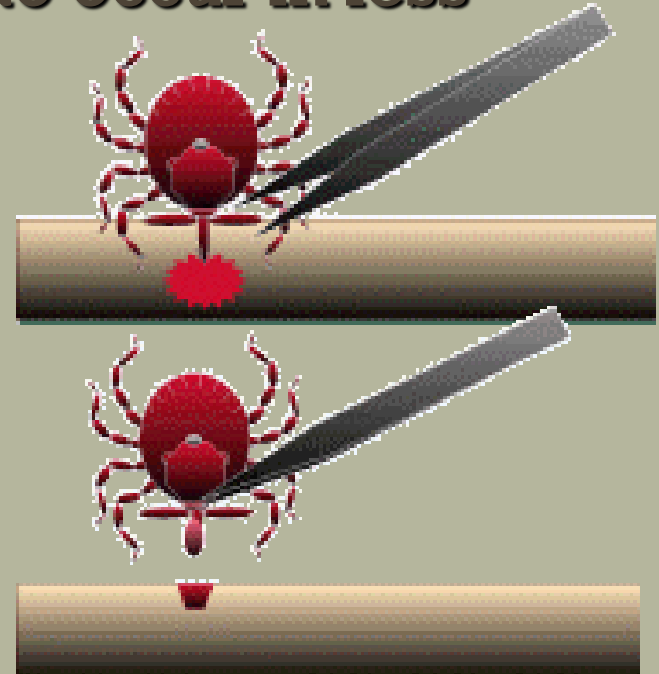
Removal the Correct Way

○ Tick check and removal

- Transmission *may* be unlikely to occur in less than 6 hours (controversial)
- Transmission from tick feces or fluids
- Use fine-tipped tweezers



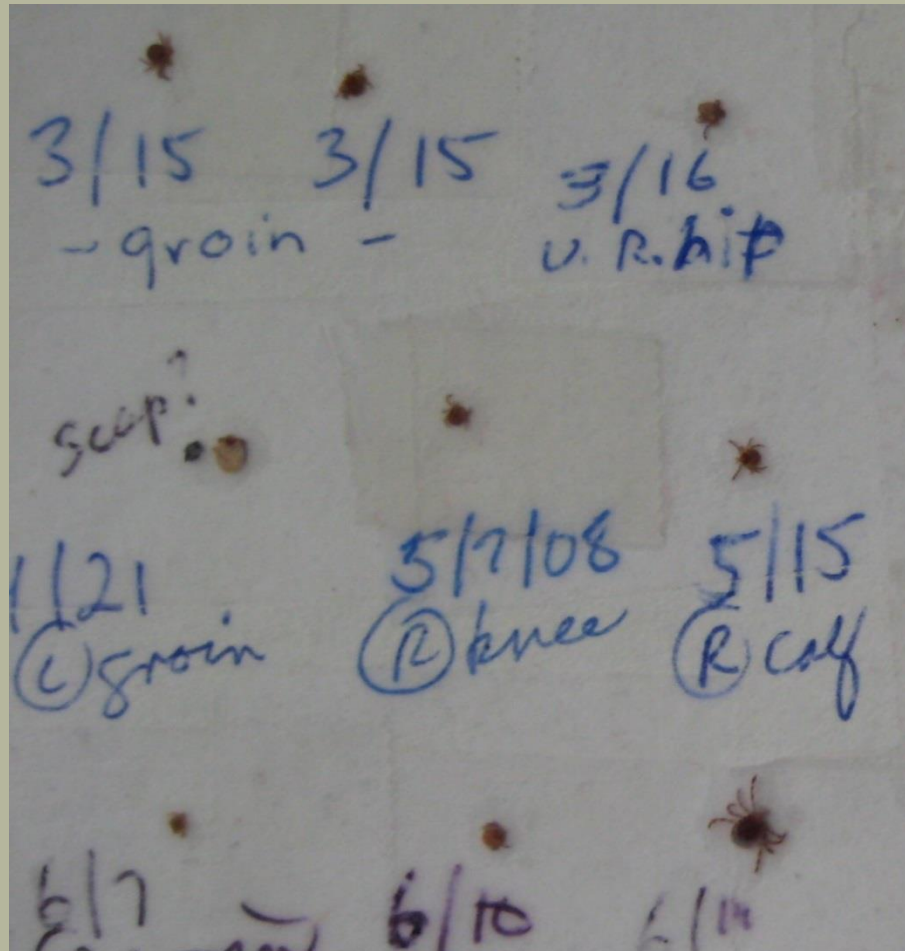
Illustrations courtesy of the CDC



Use fine tipped tweezers and pull out with a slow steady grip.

Keep the tick!

Tape on card with date and location of bite on body and geographically



Prevention

Don't go in tick-infested places unless absolutely necessary

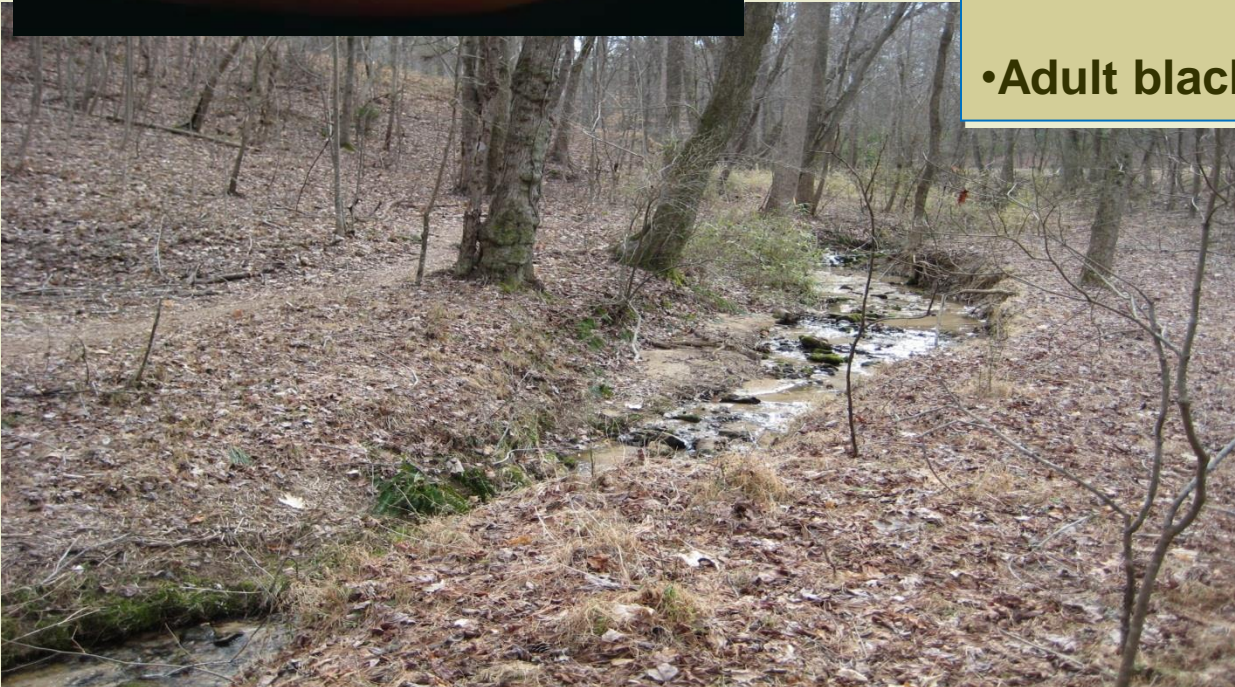
- Use repellants- DEET: at least 20% to 30%
- Wear proper clothing- treated (Insect Shield)
 - Light-colored clothing
 - Hat & long-sleeved shirt
 - Tuck your shirt into long pants
 - Tuck pants into socks, seal with duct tape
- Conduct thorough tick checks
- Use correct tick removal methods
- Make habitat less attractive
- Prevent ticks on pets
- Recognize the symptoms of tick-borne diseases



○ **COMPLETE PREVENTION IS NOT POSSIBLE!**

Tick seasons

- Worst- March through October
- Can get ticks all year
- Nymphs mostly in spring
- ‘Seed’ ticks in fall
- Adult black-leggeds in winter

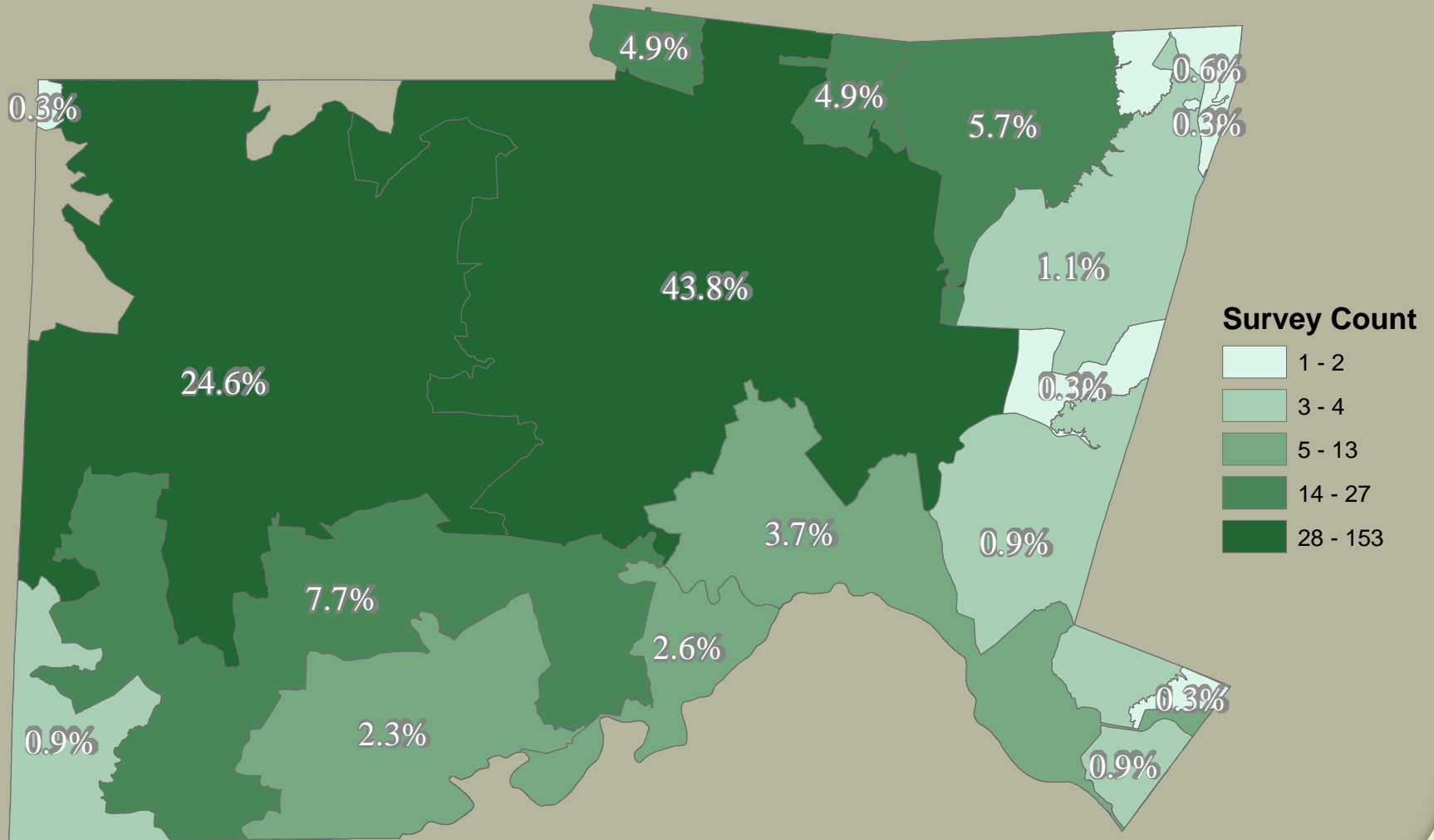


A local trail, March 2010, plenty of ticks

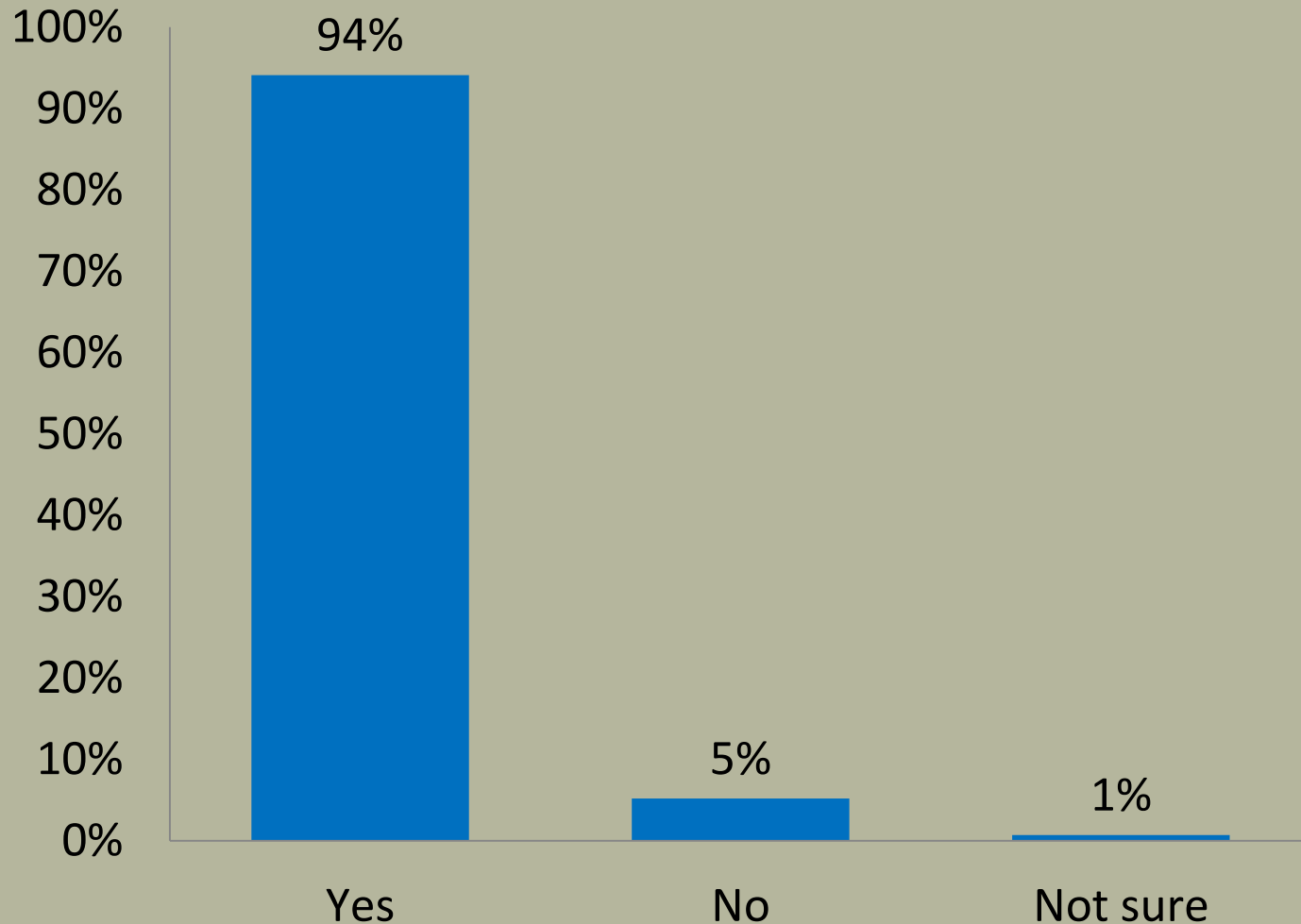
Tick Borne Illness Survey

- ◉ Conducted July-September 2015
- ◉ Emerged from Community-Centered Health Homes grant project
- ◉ Collected through Environmental Health visits, community partners and listservs/email (likely not representative of county)
- ◉ Available in English and Spanish
- ◉ Total of 429 responses

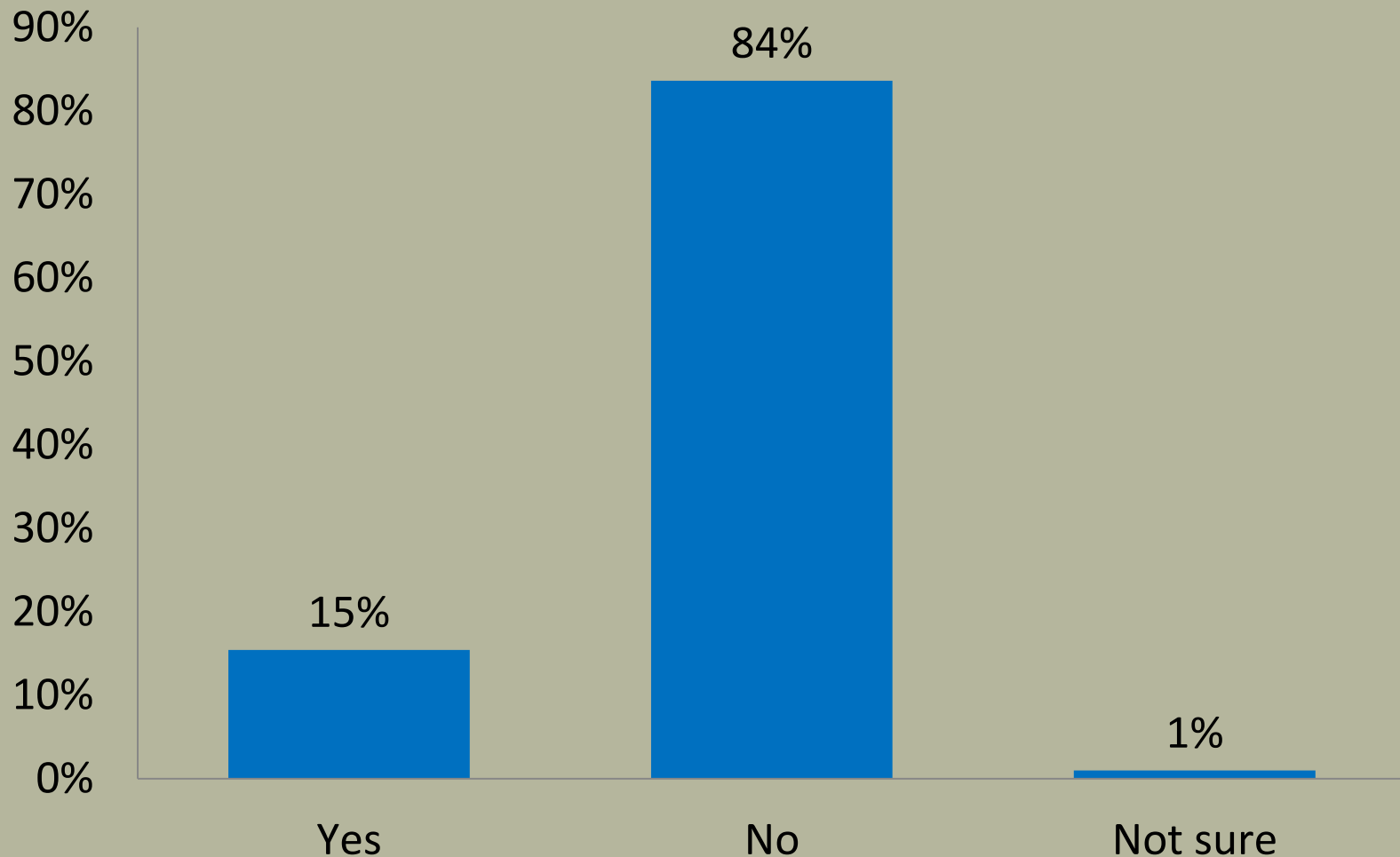
Response Distribution



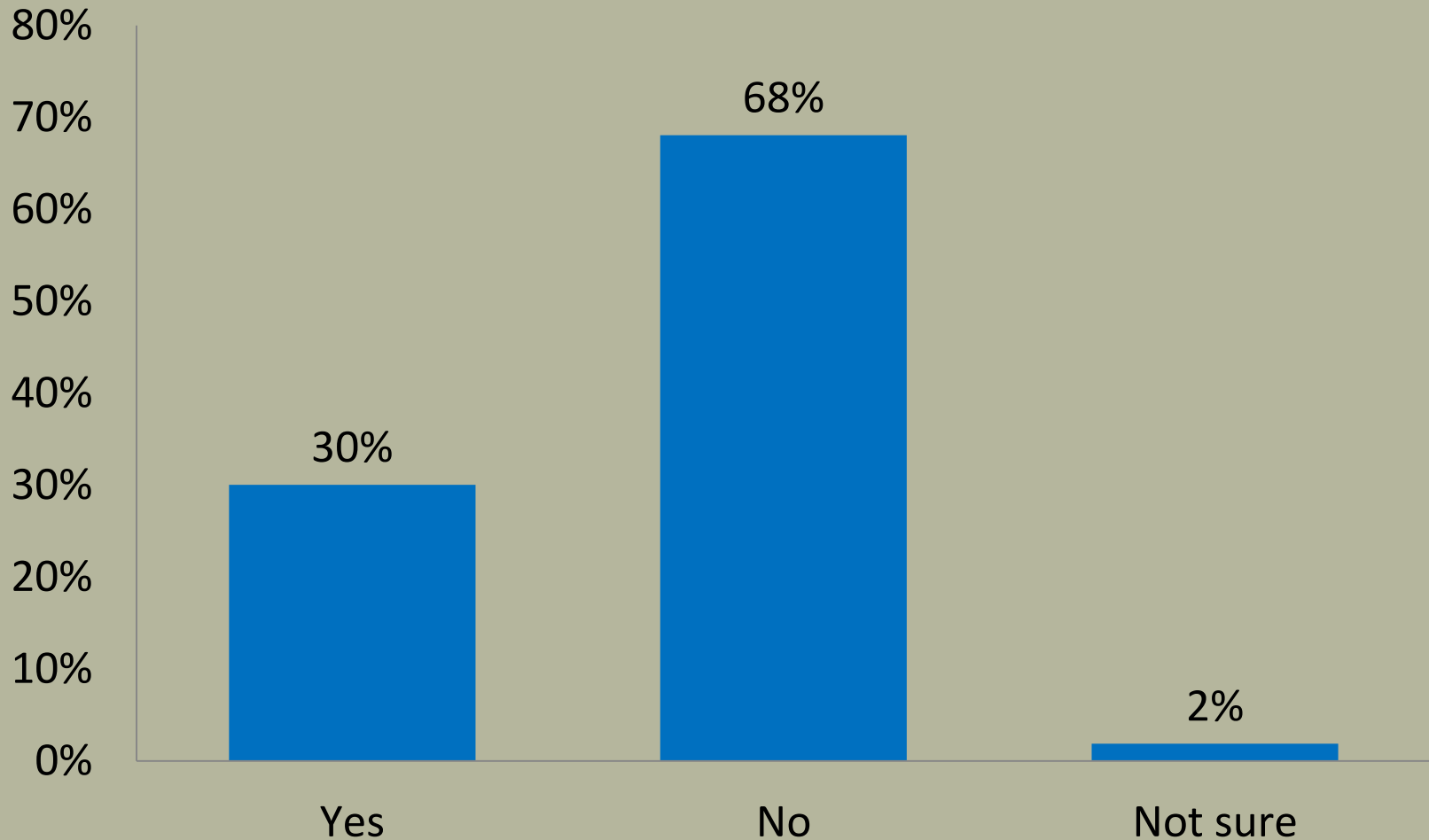
In the last year, did anyone in your household find a tick on their body?



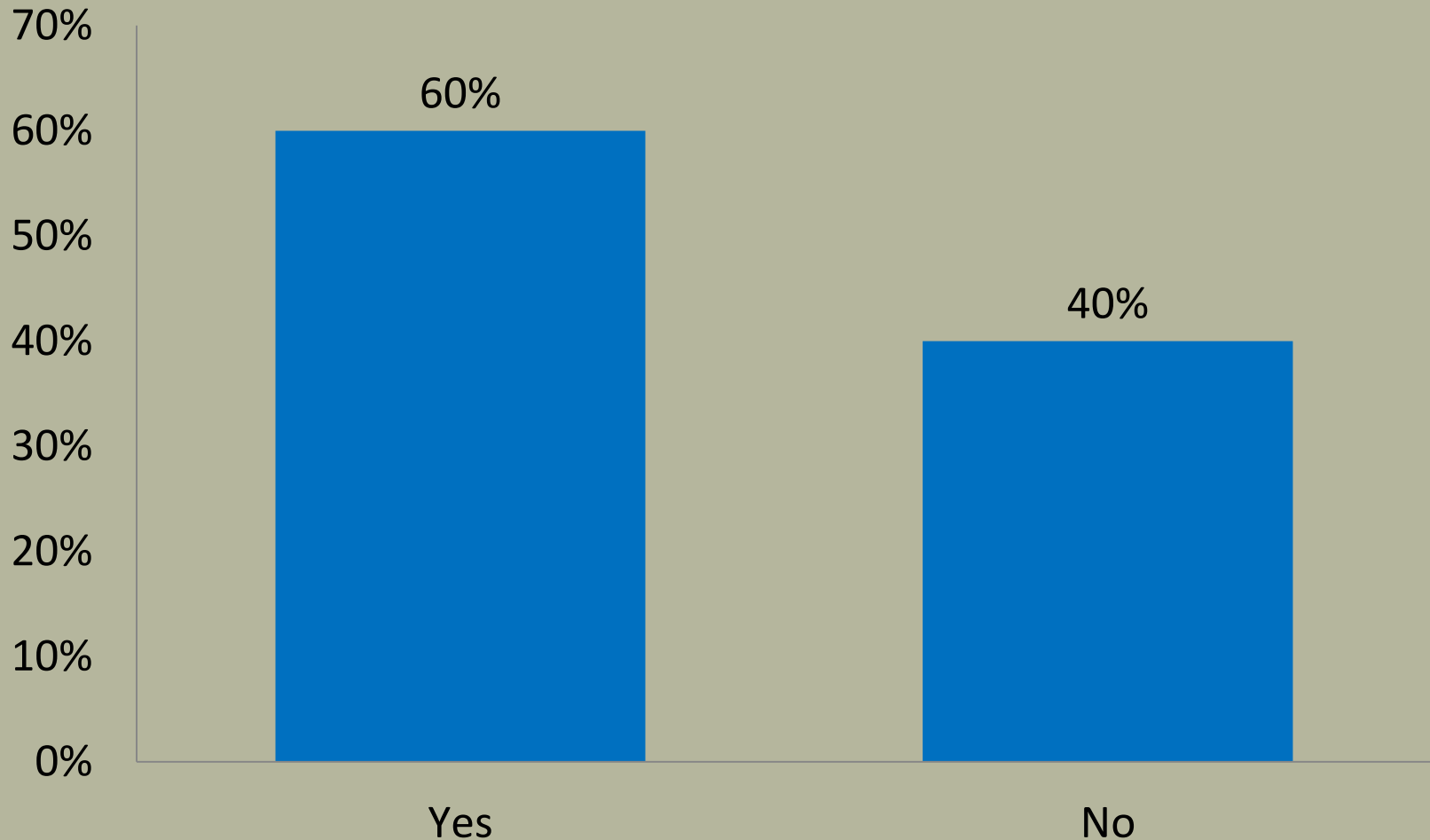
If yes, did this person consult a health care provider because of finding a tick?



Have you ever been diagnosed with a tick borne illness?



Do you personally know anyone who describes themselves as having a chronic tick borne illness?



Which of the following diseases spread by ticks occur in the area where you live?

Alpha-gal
STARI or Southern Tick Associated Rash Illness
Lyme Disease Babesiosis

Rocky Mountain Spotted Fever

Ehrlichiosis

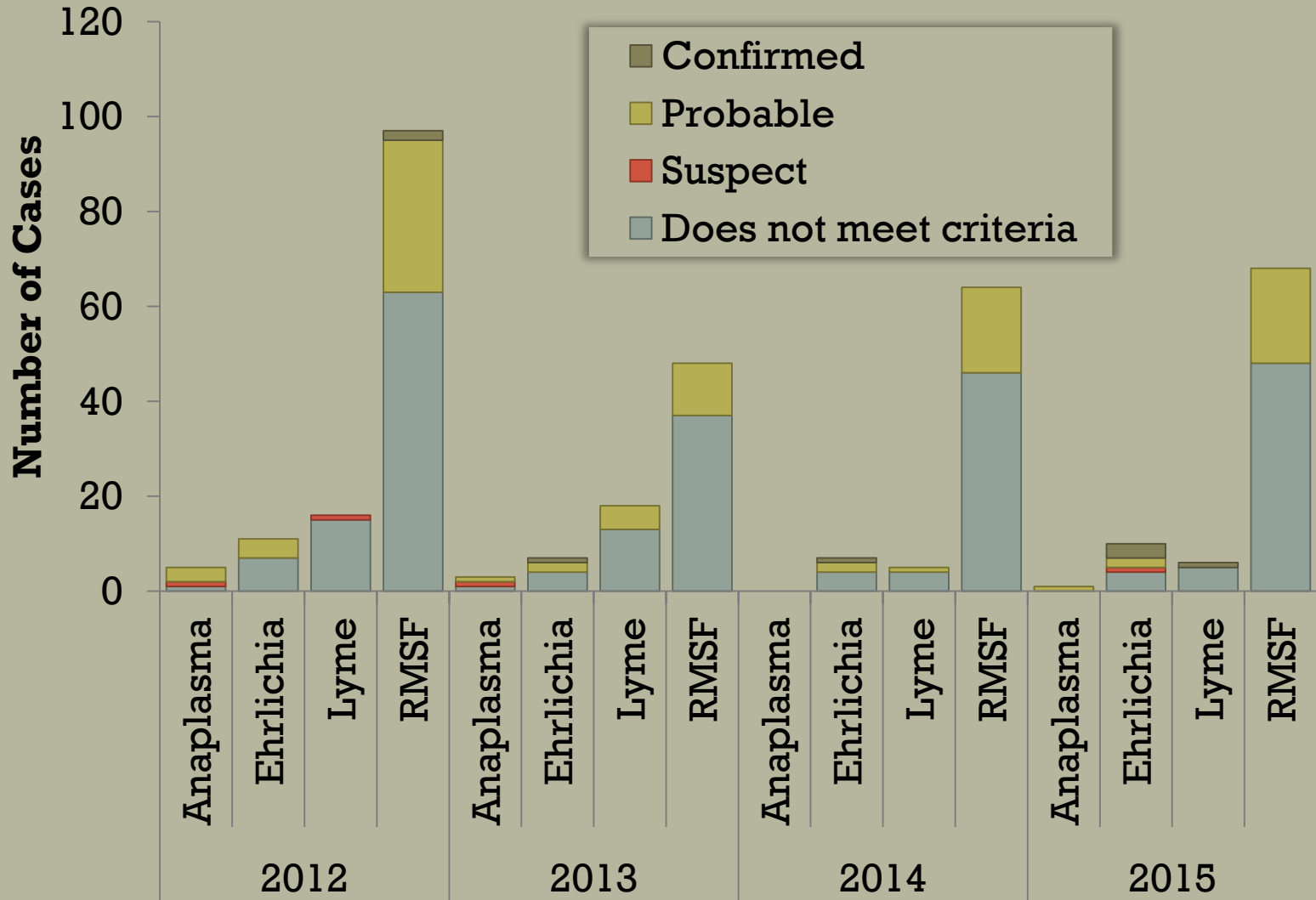
What steps do you routinely take
to prevent tick bites?

I wear repellent

I shower soon after coming indoors

I check my body for ticks when I come in

TBIs in Chatham County



Education and Outreach Efforts

2010 Let's Talk About Ticks - event at Carolina Brewery with local medical providers presenters:
Megan Davies, MD State Epidemiologist
Carl Williams, DVM State Veterinarian
Paul Mead, MD from the CDC

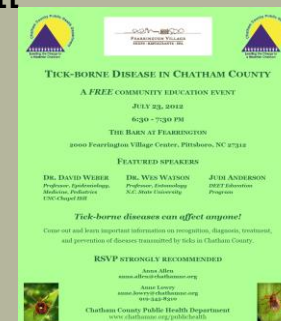


2011 Included tick information in English/Spanish in Tax Bills
Placed Tick posters at trails around Chatham County

2012 Community Tick Event at Fearrington Barn presenters included
David Weber, MD- UNC Chapel Hill
Wes Watson, PhD-Entomology NCSU
Judi Anderson- DEET Education Program



2013 Created Chatham County Tick Kit- English/Spanish
Community Canvassing Events



2014 Spoke to Community Groups about ticks

2015 Tick Billboards around Chatham County

PROTECT YOURSELF FROM TICK BITES & TICK BORNE DISEASES

WHAT ARE TICKS?

Ticks are very small arachnids that can transmit diseases while feeding on the blood of mammals.

Common Ticks in North Carolina



Ticks are small!!



Lone Star Tick



Black Legged Deer Tick



American Dog Tick

PERSONAL PROTECTION

- ◆ Walk on paths.
- ◆ Wear light colored clothing to make spotting ticks easier.
- ◆ Tuck shirt into pants and pants into socks.
- ◆ Use bug repellents according to label directions.
- ◆ Check yourself and children several times a day for ticks.



Check for ticks!



Use Repellents

TICK REPELLENTS

- ◆ Apply tick repellents containing 30% DEET to skin not covered by clothing.



30% DEET for skin

- ◆ Treat clothing with permethrin repellent



Permethrin only for clothing!!

DISEASE PREVENTION

TICK REMOVAL

- ◆ Use tweezers to grab the tick close to the skin.
- ◆ Pull slowly and steadily until the tick lets go.

DO NOT TWIST

- ◆ Wash the bite and your hands with soap and water.
- ◆ Write down the date and watch for any flu-like signs during the next 4 weeks.



WHAT TO DO IF YOU ARE BITTEN BY A TICK:

- ◆ Promptly remove the tick.
- ◆ Write the date of the tick removal and tape tick to index card as a reminder of bite for 30 days.
- ◆ If you develop symptoms within 1-30 days after being in tick prone areas consult with your physician.

SIGNS OF TICK ILLNESS:

Fever, chills Muscle Aches Headaches Rash

TICK BORNE DISEASES IN NORTH CAROLINA

- ◆ Rocky Mountain Spotted Fever
- ◆ Southern Tick Associated Rash Illness (STARI)
- ◆ Ehrlichiosis
- ◆ Lyme Disease



Leading the Charge to a Healthier Chatham

Next steps

- ◉ Continue to track tick-borne illnesses
- ◉ Educate public about prevention methods-present to community groups, write article for newspaper and conduct canvassing events
- ◉ Work with CCCC and/or other partners to conduct tick survey
- ◉ Distribute tick kits