Tick Borne Diseases

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Stony Brook Medicine’s Healthy Libraries Program (HeLP) is a partnership with the Public Libraries of Suffolk County, the Suffolk Cooperative Library System Outreach Services Department, and is supported in part by the American Heart Association of Long Island.

The program is an interdisciplinary team of public health, nursing, and social work students whose aim is to:

- Provide evidence-based health information, screening, and case management to a diverse community of patrons in the public library setting.
- Refer patrons to promote access to appropriate health and social services programs locally that will address their health and social support needs.
- For students to experience an interprofessional team and demonstrate the core competencies based on the Interprofessional Education Collaborative (IPEC).
Dr. Wellins is a Clinical Assistant Professor at Stony Brook University’s Advanced Graduate Nursing Education Program. She completed her Doctor of Nursing Practice degree in 2015 at Stony Brook University. Prior to joining the Stony Brook faculty she worked as a Nurse Practitioner in Sag Harbor, New York. She frequently saw tick-borne disease during her clinical practice due to the high prevalence of ticks on the East End of Long Island. She is a member of the East End Tick Advisory Council which focuses on tick-borne disease education, treatment and prevention for the community, and as a resource to local health care professionals. She is currently a co-investigator in a NIH funded study on Lyme disease in collaboration with Rutgers University.
The Regional Tick-Borne Disease Resource Center at Stony Brook Southampton Hospital educates the public, promotes collaboration and educational opportunities within the medical community, and facilitates access to the diagnosis and treatment of tick-borne diseases.

Dr. Wellins is on the advisory panel for the center.

The center offers a “Help Line” where callers can receive expert advice on tick removal, help understanding laboratory results, and when appropriate referrals to physicians and other medical professionals. You can call at (631) 726-TICK

Their website offers educational materials that you can view or print, articles and even tick tips on YouTube. https://southampton.stonybrookmedicine.edu/services/tick-borne-disease-resource-center
PUBLIC HEALTH CRISIS

Education is key!
Knowledge is power!

PROGRAM OBJECTIVES:
• Identify the definition of a vector.
• Identify environmental/habitat disruptions that increase tick populations.
• Identify common signs and symptoms of Lyme disease.
• Identify common treatments for tick-borne diseases.
• Identify things you can do to reduce your risk of getting a tick bite.
Thank you for attending this webinar!

We would like to know how well we are doing in meeting our learning objectives.

Please complete the poll on the screen.

It is anonymous, name or identifiers will not be recorded or known to us with your responses.
Life Cycle
Same for all hard-bodied ticks
Blacklegged ticks

Ixodes scapularis (Blacklegged ticks or Deer ticks)
Lone Star Ticks

- Adult female
- Adult male
- Nymph
- Larva
Dog Tick

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Life Cycle of the *Ixodes scapularis* Tick

**Winter**
- Eggs Deposited
- Adults Die

**Spring**
- Egg → Nymph → Larvae
- Feeds once, 3 weeks
  - (Deer is preferred host)
- 1 month

**Summer**
- Larvae
- Feeds once, 3-4 days
  - (Mouse is preferred host)

**Fall**
- Nymph
- Feeds once, 2 days
  - (Mouse is preferred host)
Engorgement with feeding
Tick bites especially nymphal ticks are usually painless, the ticks are tiny, and consequently many people are unaware that they have been bitten.
Environmental Factors/habitat
Predators are Reduced
Vector

• An organism, typically a biting insect or tick, that transmits a disease or parasite from one animal to another
Reservoir

- Animals such as rodents where an infectious agent normally lives and multiplies.
- The reservoir typically harbors the infectious agent without injury to itself.
Host

• An animal in which a parasite, bacteria or virus lives.
Tick-Borne Illness

Black Legged Deer Ticks
• Lyme Disease (most common)
• Babesiosis
• Anaplasmosis

Lone Star Ticks
• Ehrlichiosis
• STARI
• Alpha-Gal Meat Allergy
• Rickettsia
• Tularemia

Dog Ticks
• Rocky Mounted Spotted Fever
• Tularemia
History

- Tick exposure?
- Rash?
- Symptoms? Flu like symptoms?
- Facial Palsy?
- Lab/diagnostics – Tick panel, PCR, blood count, chemistry panel...
  Parasite smear
- Treatment
- Prevent/reduce future exposure
Lyme Disease

- Most common tick vector disease causes by the Black legged tick (deer tick)
- 300,000 cases in US/year
- Estimated 40-60% adult ticks infected, 20% nymphs infected
- Nymphs active Spring/Summer, Adults continue to be active from Fall- Spring if temperatures above freezing
- Ticks require humid conditions to live/thrive
Lyme Disease

- Ticks feeding for >24 hours higher likelihood in disease transmission
- Tick mouthpart barbed anchor cements into skin, tick saliva irritant, spirochete in gut back washes into tick mouth - enters into animal/person
- Bull’s eye rash (<50%), flu like symptoms, joint/muscle aches, fever/chills, headache, neck pain, fatigue, mental cloudiness “brain fog”, Facial palsy, visual changes....
LYME DISEASE

- Diagnostic tests: 2 tier Antibody test
- 1 month after exposure if no antibiotics
- Doxycycline x 14-28 days (avoid sun exposure, take with food, probiotics) Long courses not for children <8 years
- Other antibiotics-amoxicillin
- Chronic Lyme: Neurological symptoms-intravenous antibiotics
Two-Tiered Testing for Lyme Disease

First Test
- Enzyme Immunoassay (EIA)
  - OR
  - Immunofluorescence Assay (IFA)

Positive or Equivocal Result
- Signs or symptoms ≤ 30 days:
  - IgM and IgG Western Blot
- Signs or symptoms > 30 days:
  - IgG Western Blot ONLY

Negative Result
- Consider alternative diagnosis
  OR
  If patient with signs/symptoms consistent with Lyme disease for ≤ 30 days, consider obtaining a convalescent serum
Not all rashes are alike!
Lyme Disease

**Stage 1**- local early infection (3-30 days after exposure)
- Rash, flu like symptoms

**Stage 2**- (weeks to months after exposure)
- Joint pain, arthritis, headache, fatigue
- 10-20% neurological s/s, <10 % cardiac involvement

**Stage 3**- late persistent infection (months to years later)
- Fibromyalgia (muscle pain)
- Arthritis of large joints,
- Memory changes
- Depression
Post Treatment Lyme Disease Syndrome (PTLDS)

- May result from autoimmune activation
- Dependent on individual immune system
- Joint swelling similar to arthritis
- Chronic neurologic symptoms—may require spinal tap analysis and IV antibiotic treatment
- Cardiac involvement
Post Treatment Lyme Disease Syndrome, continued

- Occurs within 6 months after treatment for Lyme disease
- Fatigue, widespread musculoskeletal pain (pain in at least 3 areas)
- Medically unexplained symptoms
- Cognitive - Difficultly finding words, focusing or concentrating, Memory usually intact
- Autoimmune? Smoking makes symptoms worse!
Babesiosis

- Deer Ticks - co infections can occur!
- Malaria-like illness caused by parasite (Babesia microti)
- s/s fever, chills, headache, muscle pain, headache, s/s may be more severe if co-infection with Lyme disease
- Blood smears, IgM/IgG, PCR
- CBC - low platelet count and white blood cells, elevated liver enzymes
- Treatment - Mepron (atovaquone), azithromycin
Ehrlichiosis & Anaplasmosis

- Deer Tick - Anaplasma phagocytophilum:
- Lone Star Tick – Ehrlichia chaffeensis
- s/s Fever, fatigue, chills, headache, severe muscle aches
- Blood smears, antibody testing (decreased platelets, ↓ WBC, elevated liver function tests)
- Doxycycline
- Rash may indicate co-infection with Lyme disease
Rocky Mountain Spotted Fever

- Mostly transmitted by Dog Tick- *Rickettsia rickettsia*
- s/s fever, headache, myalgia, spotted rash on wrists, ankles, palms/soles
- treatment - doxycycline
Other tick borne diseases

**Borrelia miyamotoi** - similar signs and symptoms to Lyme disease (tick relapsing fever)
- Treatment with antibiotics – doxycycline

**STARI** (Southern Tick-Associated Rash Illness) - Lone Star tick Similar to Lyme Disease, no test available
- Treatment with antibiotics – doxycycline

**Powassan Encephalitis** - virus: Sudden symptoms 7-14 days after bite - headache, fever, vomiting, neck stiffness, confusion, seizures. Death in 10-15% of infected individuals
- 50 % survivors – permanent neurologic deficits
- No specific treatment!
Alpha Gal Meat Allergy

- Galactose-alpha-1,3 galactose (antibody reaction to a carbohydrate present in non-primate mammals) or **Alpha Gal**
- Lone Star tick larval bites late summer/early fall
- Usually thought of as “Chigger Bites”
- Delayed allergic reaction (6 hours) after eating mammalian meat “midnight anaphylaxis” can resolve over time with no further exposure to Lone star ticks-
- Worse reaction with high fat meats
Symptoms range from itching, GI upset to full allergic reaction affecting breathing (medical emergency/911)

- Alpha gal testing
- Referral to allergist, avoid mammalian meat, gelatin
- Wanes with time as long as there is no re-exposure to Lone star larva

Need epi pen!
Tick Removal

Pull tick slowly up and away from the skin

- Hypostome
- Barbs
- Tweezers
Risk of Tick-Borne Disease

- Tick imbedded for 36 hours or more
- Tick engorged when removed
- Prophylactic single dose of doxycycline 200mg
- Doxycycline DOES NOT treat Babesiosis
Protect Yourself Against Lyme Disease in Spring, Summer, and Fall

1. Walk in the middle of trails, away from tall grass and bushes.

2. Wear a long-sleeved shirt.

3. Wear white or light-colored clothing to make it easier to see ticks.

4. Wear a hat.

5. Spray tick repellent on clothes and shoes before entering woods.

6. Wear long pants tucked into high socks.

7. Wear shoes—no bare feet or sandals.
FOUR POSTER PROGRAM
Repellant

When venturing into tick habitat, a combination of both DEET for skin and permethrin on clothing should be considered.
Insect Repellent

CAUTION:

Avoid bites.
MOSQUITO REPELS 4 HRS.
APPLY CORRECTLY.

Avoid bites.
TICK REPELS 6 HRS.
APPLY CORRECTLY.

Avoid bites.
MOSQUITO REPELS 6 HRS.
APPLY CORRECTLY.
Tick Prevention

- Repellant on skin
- Cover up
- Permethrin on shoes/clothing
- Shower immediately
- Daily tick checks
- Dry clothes first before washing
- Double sided tape
- Lint rollers
- No flip flops
Pets

- Frontline or oral medications
- Electric fence, enclosed areas
- Tick checks
- Keep off beds/furniture
Prevention

• Create tick free zones around home by cutting back wooded areas and increasing the size of open lawn
• Keep grass mowed to 3 inches or less
• Place play areas in sunshine
• Remove leaf litter, moist plant litter, brush, weeds and other debris
• Create borders (pebbles, cedar chips) to separate lawn from the wooded areas
PREVENTION, continued

• Eliminate dense plant beds such as ivy and pachysandra.
• Reduce/eliminate rock walls, woodpiles, and birdfeeders. These attract mice and chipmunks which hide, nest and eat spilled food from these sources.
• Keep garbage in tightly closed containers
• Reduce plants that attract deer
• Spraying property
1. Tick zone
   Avoid areas with forest and brush where deer, rodents, and ticks are common.

2. Wood chip barrier
   Use a 3 ft. barrier of wood chips or rock to separate the “tick zone” and rock walls from the lawn.

3. Wood pile
   Keep wood piles on the wood chip barrier, away from the home.

4. Tick migration zone
   Maintain a 9 ft. barrier of lawn between the wood chips and areas such as patios, gardens, and play sets.

5. Tick safe zone
   Enjoy daily living activities such as gardening and outdoor play inside this perimeter.

6. Gardens
   Plant deer resistant crops. If desired, an 8-ft. fence can keep deer out of the yard.

7. Play sets
   Keep play sets in the “tick safe zone” in sunny areas where ticks have difficulty surviving.

Based on a diagram by K. Stafford, Connecticut Agricultural Experiment Station.
Future vaccine

- Research involving proteins in tick salivary glands
- Blocks the tick’s ability to feed and transmit pathogens causing the tick to drop off
PREVENT LYME DISEASE!

- WEAR REPPELLENT
- CHECK FOR TICKS DAILY
- SHOWER SOON AFTER BEING OUTDOORS
- CALL YOUR DOCTOR IF YOU GET A FEVER OR RASH

For more information:
www.cdc.gov
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Do you have any questions?
Do you think there was anything missing from the webinar?
Was there something else you would have liked to discuss?

Do you have any suggestions for future webinar topics?