Tick-Borne Illness Prevention

Jo Ellis, Director, Education Outreach

NOLS - WRMC

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What’s our mission?

- To make Lyme disease... **easy** to diagnose and **simple** to cure

- Funding 27 institutions & 37 projects
- Raised $16m in 5 years
Why Funding is Needed

Annual NIH Spending per New US Patient*

Malaria: 2K cases, $135,294
HIV/AIDS: 40K cases, $97,280
West Nile: 2K cases, $21,405
Lyme Disease: 330K cases, $85

*Estimated in 2016

Number of NEW cases annually in U.S.

Only $85 per Lyme patient annually
The Diagnostic Problem

100 people with Lyme disease

Only 50% have a rash or see a tick

Only 50% see an MD

Current CDC testing misses 60% of positives
So, what is Lyme disease?

- Bacterial infection
- Transmitted to humans by a tick bite
- Spiral shaped bacteria (spirochete)
- Very similar to syphilis
- Identified in 1975 in Lyme, CT
- Disease agent discovered in 1982 by Dr. Willy Burgdorfer
- Scientific name: *Borrelia burgdorferi*
- Acute flu-like illness in summer and fall on the East Coast – elsewhere can be year-round
Lyme disease – Fast Facts

- **Fastest-growing** vector-borne infectious disease in US
- Cases reported in **49** states
- **330,000** *new* cases per year
- People who **work or play outdoors** are particularly at-risk
- Frequently misdiagnosed by doctors especially W. Coast
- Tick season is **YEAR ROUND** in California/Southern U.S.
Ticks of the United States

- American Dog Tick
- Lone Star Tick
- Blacklegged Tick
- Brown Dog Tick
- Groundhog Tick
- Gulf Coast Tick
- Rocky Mountain Wood Tick
- Soft Tick
- Western Blacklegged Tick
Tick-Borne Diseases in the US

- Anaplasmosis
- Babesiosis
- Bartonella
- Lyme disease (*Borrelia burgdorferi*)
- *Borrelia miyamotoi*
- *Borrelia mayonii*
- Bourbon virus
- Colorado Tick Fever
- Ehrlichiosis
- Heartland virus
- Powassan virus
- Southern Tick-Associated Rash Illness
- Spotted Fever Group Rickettsia
- Tick-borne Relapsing Fever
- Tularemia

*One bite can transmit multiple infections that can be very serious and debilitating*
Key findings from our tick-testing study…

- Ticks in 83 counties in 24 states where previously undetected
- 16,000 ticks collected from 49 states
- All life stages of three major tick species were infected

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0199644
Research shows ticks in NEW places

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0199644
Where is the bacteria coming from?

- The bacteria is in the blood of wild mammals – mice, voles, squirrels and deer
- The ticks get infected when they feed on the blood of infected mammals
- Bacteria transmitted to humans from other animal reservoirs
Lifecycle of a tick: two years

1. Ticks must get blood meal to develop
2. Opportunistic—feed on most animals
3. If feed on a mammal carrying bacteria, they become infected
Ticks are really small …
Why tick bites are very difficult to detect

- Ticks are so tiny, they are easily missed with the naked eye
- 40-50% of people diagnosed never recall a tick or a bite
Transmission times are controversial

- There’s really no “safe” time period for a tick to be attached to you
- Bacteria may be in salivary glands or get transmitted during feeding
- Never squish a tick on your bare skin! The bacteria can penetrate it!
Visual signs of Lyme Disease:

- **Expanding** rash 3-30 days following tick bite*
  - Round, oval, triangular, irregular shaped rash
- Rash is not normally itchy or painful

This rash may be confused with allergic reactions to tick bites. (However, allergic reactions occur within 24 hours of the bite and they **do not spread**)

*The rash does not appear on everyone who has been exposed to Lyme disease—it’s only 43-70% of cases*
Be alert to **expanding** rashes...

Classic “bull’s-eye” rash which doctors will typically recognize

A more common rash from a tick bite
Not just “bull’s-eye” rashes…

- Some rashes have a blue cast
- The photo to the right shows multiple rashes
Other signs of Lyme disease:

- **Within days of exposure:**
  - Flu-like symptoms - fever, chills, fatigue, muscle aches, joint pain, headache, swollen lymph nodes

- **Within weeks to months of exposure:**
  - Musculo-skeletal: arthritis in one or more joints
  - Nervous system problems: fallen face, numbness, tingling, or pain in the arms and legs
  - Heart problems (<10%): disturbances in the heart rhythm

- **Within months to years of exposure:**
  - Musculo-skeletal: severe joint pain & swelling (60% of patients)
  - Neurologic complaints: shooting pains, numbness, tingling, problems with short-term memory
Issues in the Lyme disease field

Unreliable Diagnostics

- 50% chance of misdiagnosis
- No validated “direct detection” methods

Unreliable Therapeutics

- Long-term antibiotics are currently prescribed, but more data is needed as to optimal regimen

May be millions suffering with “Chronic Lyme”/post-treatment Lyme Syndrome and the cause is still unclear

Epidemic is misunderstood especially in the Western United States

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Currently, **no** reliable diagnostic test exists

- The average patient sees 5 doctors over nearly 2 years before being properly diagnosed
- Fewer than 50% of patients remember a tick bite
- Fewer than 50% of patients recall any rash
- And again … 35%-50% of Lyme disease missed by current tests
Common Misdiagnoses

- ‘Flu
- Lupus
- Fibromyalgia
- Epstein Barr Virus
- Chronic Fatigue Syndrome
- Multiple Sclerosis
- Rheumatoid arthritis
- Thyroid disorders
- Psychiatric disorders
- Crohn’s disease
- Early ALS
- Early Alzheimer’s
- Dementia
- Depression and/or anxiety
- Hormonal imbalances
- …. and so on
Risk: For individuals

- Your job puts you at high risk for exposure
- Be **ALERT** to ticks!
- Educate yourself about the dangers of tick bites
- Know what to do if you or a colleague/client are bitten
- Advocate for yourself with medical professionals and INSIST on early treatment

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Risk: Organizations

- Landmark case against Hotchkiss School in 2017 - $41m negligence case upheld
- Organizations exposed to tick-borne disease suits
Prevention 1: Treat CLOTHES

- Ticks DIE if they crawl on clothing treated with permethrin as it’s an *insecticide* - harmless to humans
- You can do it yourself for under $10, or…
- Get clothing treated through [www.insectshield.com](http://www.insectshield.com)
Prevention 2: Repel ticks …

- Use repellent with > 20% DEET

Use reliable sources when researching alternatives to DEET:

- National Pesticide Information Center npic.orst.edu
- Centers for Disease Control and Prevention cdc.gov
- Environmental Protection Agency epa.gov

Insect repellents can be very effective when re-applied frequently
Prevention 3: Learn CORRECT way to remove a tick!

- Grasp tick as close to skin as possible
- Use needle-nose tweezer or tick-removal tool
- Pull firmly but gently away from skin
- Do not twist or yank – you may shock the tick
- Avoid “alternative” methods
- SAVE the tick for testing
Prevention 4: Practical tips

- If possible, wear light-colored clothing
- Wear long pants and sleeves
- Tuck pants into socks
- Run clothing through DRYER before washing!
- AVOID doing this if you have been in Poison Oak
Prevention 5: Tools for risk mitigation

People need information and reminders to protect selves and organization:

- policies & waivers
- training
- signage
- tools
Prevention 6: Check for ticks

- Head/hair
- Ears
- Folds of neck
- Armpits
- Waistband
- Groin
- Backs of knees
- Check your pets, too!
  Ticks can be hitch-hikers

Check for ticks **EVERY DAY!**

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Prevention 7: If you get bitten or develop symptoms

PREVENT LYME BY...

- Seeing a doctor as soon as possible
- Asking for antibiotic doxycycline (28 days)
- Continuing to monitor yourself for symptoms, even after completing antibiotics
Prevention Tips Summary

- Remove ticks IMMEDIATELY!
- Save ticks for testing
- TREAT clothing with permethrin
- Use >20% DEET on exposed skin
- Tuck long hair up into hat
- Long-sleeved shirts/pants
- Run clothing through hot dryer 10-15 minutes BEFORE washing
- Watch for symptoms
- Go to Dr. if you get bitten

TICK CHECK EVERY DAY!
Questions?

www.bayarealyme.org