

SE PA
New Castle County, DE
Cecil County, MD

The Lyme Disease Association of Southeastern Pennsylvania, Inc. (LDASEPA), an all volunteer non-profit 501(c)3 organization, is intended as a resource for individuals interested in learning about Lyme disease and other tick-borne diseases.

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Lyme disease...A little bite to possible major consequences

Key components

The most common insect-borne disease in the US

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deer tick

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spirochete

deer tick

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deer tick reproduction (primary) & dispersal

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Key components

The most common insect-borne disease in the US

- Symptoms
- The microbe "spirochete"
- Lyme disease dilemmas
- Endemic regions/ages at risk
- Infection incidence (CDC)
- Ticks/risk of being bitten
- Protection practices

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Symptoms...more than a rash!

deer tick

"classic" rash, but any rash is suspect

can be hidden!

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- Fatigue...unrelenting
- Musculoskeletal pain, arthritis...severe
- Heart, eye, hearing & GI...serious
- Neurologic symptoms...headache, stiff-neck, balance, facial paralysis, cognitive impairment, sleep disturbance, nightmares, hyper-sensitivities
- Neuropsychiatric symptoms...depression, anxiety, panic attacks, suicide, oppositional, ADHD, and possibly ASD behavior (children)

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diverse and fluctuating symptoms!

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Symptoms...children in school

Dozing in class, missing class due to tiredness

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Difficulty seeing and following visually presented material, frequent blinking or tics, inability to coordinate eye movement

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- Short-term sequential or spatial memory deficit

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- Withdrawal from peers or shift to a lower functioning group, cessation of involvement in sports or other extra-curricular activities

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The microbe...Borrelia burgdorferi



- Spirochete...related to "syphilis"
- Several physical forms
- Genetically complex

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The microbe...Borrelia burgdorferi

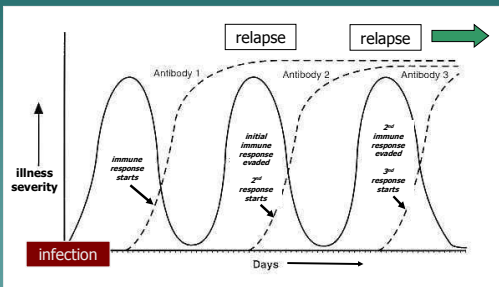


- Spirochete...related to "syphilis"
- Several physical forms
- Genetically complex
- Systemic Evades immune response

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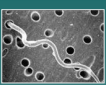
The microbe...Borrelia burgdorferi

A mechanism to evade immune response: "cyclic change in spirochete antigen expression"



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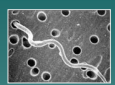
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- Invades cells & the central nervous system

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The microbe...Borrelia burgdorferi



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- Several physical forms
- Genetically complex
- Systemic Evades immune response
- Invades cells & the central nervous system
- Transmitted by a deer tick (other biting insects, blood, across placenta, & sexual contact?)

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Lyme disease...dilemmas

Public and physicians are not sufficiently informed

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Lab tests are inadequate (physician default)

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Misdiagnosis...flu, spider bite, ADD, CFS, FM, MS, ALS, Parkinson's and Alzheimer's disease

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Missed co-infections... (Babesia, Bartonella, Ehrlichia, Anaplasma, etc.)

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Co-infections

- **Babesia (Babesiosis)**...malaria-like parasite; infection of red-blood cells; chills, fatigue, night sweats (drenching), spaciness sense, depression, headache, muscle pain
- **Bartonella (Bartonellosis)**...bacterium; cat scratch fever; agitated fatigue, insomnia, sweats, headaches, anxiety, panic, agitation, rage, aggression, confusion, (CNS > Lyme symptoms), heel pain, gastritis, red stretch-like marks 
- **Ehrlichia/Anaplasma (Ehrlichiosis/Anaplasmosis)**... rickettsial bacterium; similar to Lyme symptoms, except violent headaches and high fever

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Lyme disease...dilemmas

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No vaccine (LYMERix™ hla-dr4 gene?)

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Controversy...medical/political
(antibiotic treatment duration & chronic infection)

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Endemic regions & ages at risk

Centers for Disease Control (CDC)

Reported Cases of Lyme Disease -- United States, 2006

~95% of cases

hyper-endemic region

1 dot placed randomly within county of residence for each reported case

CDC surveillance criteria record only ~1 out of 10 cases

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Endemic regions & ages at risk

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cases of Lyme Disease, 1991-2005

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Endemic regions & ages at risk

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ages of individuals from whom deer ticks were removed

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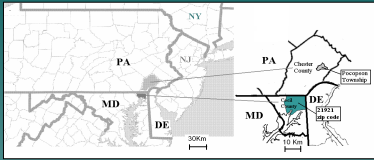
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LD survey of Cecil County, 21921 zip code & Pocopson Township, Chester County, PA



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LD survey of Cecil County, 21921 zip code & Pocopson Township, Chester County, PA



Survey site	Individuals (%) NOT diagnosed with LD	Individuals (%) diagnosed with LD	Households (%) with member(s) with LD	Individuals (%) reporting post-treatment symptoms
Pocopson Township	795/1006 (79)	211 (21)	164 (48)	68 (31)
Cecil County 21921 zip code	554/675 (84)	103 (16)	84 (34)	23 (23)

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2006 CDC "surveillance" Lyme disease cases (19,931)

State/County	Cases	Rank	Incidence*
PA	3,242	2	26
Chester County	~550	-	102
MD	1,248	7	22
Cecil County	63	-	63
DE	478	10	56
New Castle County	289	-	55

*cases per 100,00 population (8% US average)

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Lyme disease was ~8X the number of U.S. West Nile cases!

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2007 provisional CDC "surveillance" Lyme disease cases (20,599)

State/County	Cases '06>'07	Rank	Incidence*
PA	3,242 > 4,666	2 > 1	26 > 38
Chester County	-	-	102 > 111
MD	1,248 > 2,298	7 > 3	22 > 41
Cecil County	-	-	63 > ?
DE	482 > 697	10 > 9	56 > 82
NC County	-	-	55 > ?

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Residential development impact

...increase in infected ticks

Species	Ability to transmit the Lyme disease spirochete
White-footed mouse	Very high
Eastern chipmunk	Very high
Shrews	Very high
Raccoon*	Low
Opossum*	Low
Striped skunk*	Low
Red and grey squirrel*	Low
White-tailed deer*	Low
Birds (~ground feeding)	Low-? (migratory/feeders)

*high numbers of ticks, but poor transmitters = dilution effect

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Ticks & risk of being bitten

adult females

nymph adult
(poppy seed size)

Lyme disease STARI
deer tick

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female laying eggs

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deer tick lone star tick

engorged deer tick
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tick saliva...
immunosuppressors
protects spirochete

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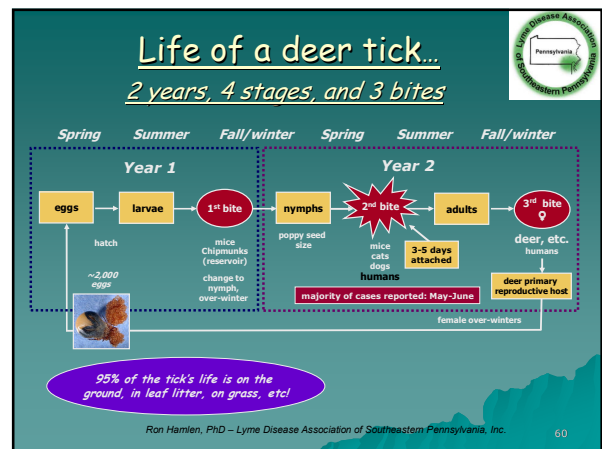
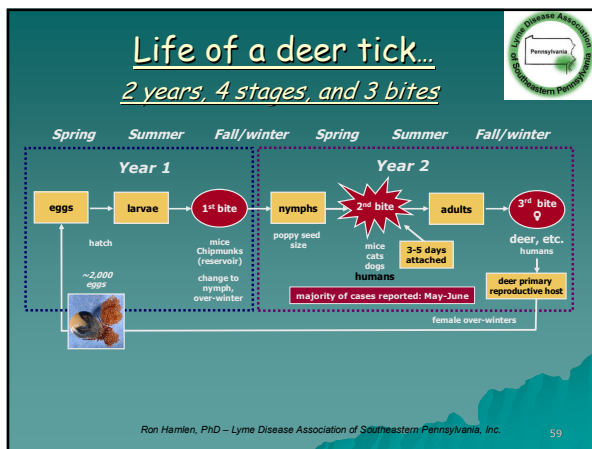
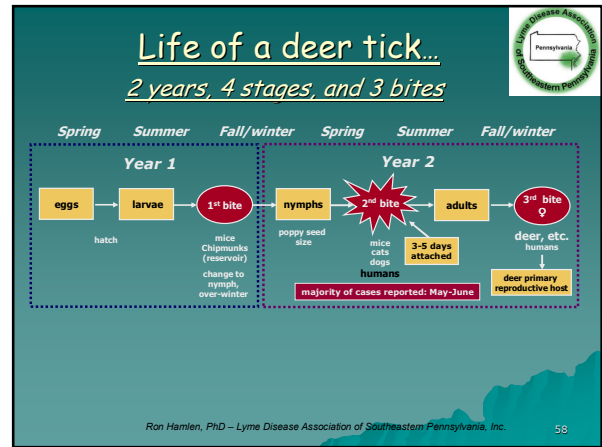
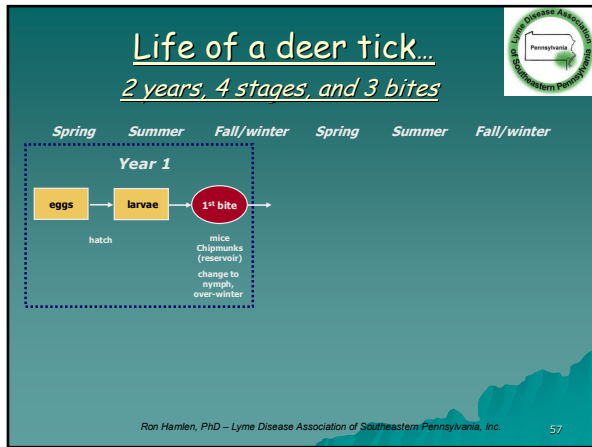
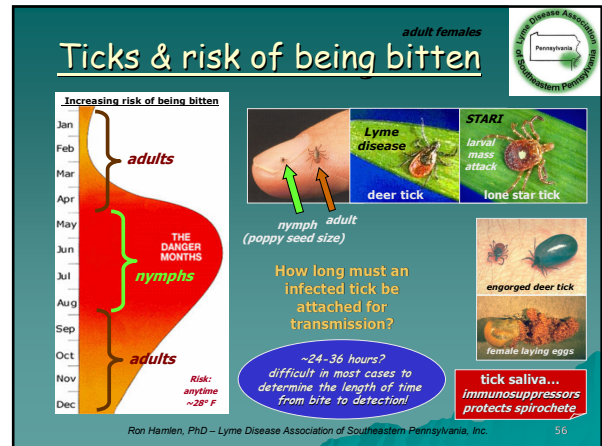
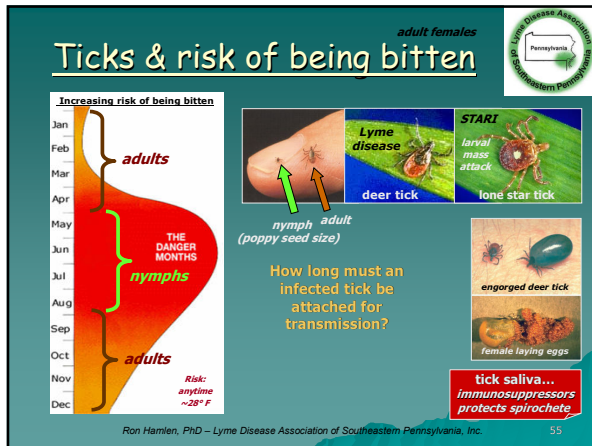
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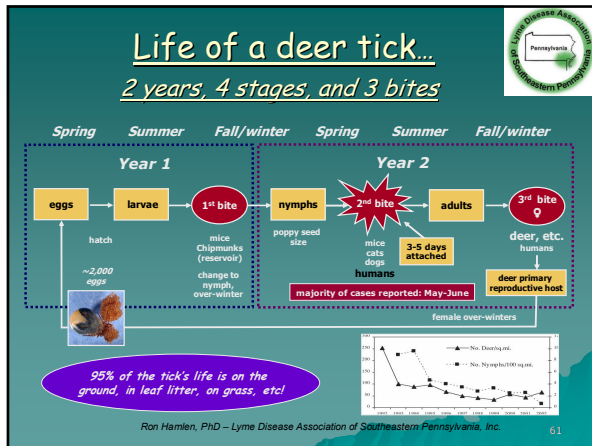
Increasing risk of being bitten

Jan adults
Feb adults
Mar adults
Apr
May THE DANGER MONTHS nymphs
Jun nymphs
Jul nymphs
Aug nymphs
Sep
Oct adults
Nov adults
Dec adults

Risk:
anytime
~28° F

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Protection...why?

- Every bite increases the risk of getting...
 - More spirochetes... "the dose makes the poison"
 - More virulent strains... increase disease severity
 - Other tick-borne infectious microorganisms... *Babesia, Anaplasma, Ehrlichia, Bartonella, etc.*

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 - No existing method will eliminate deer ticks
 - Can reduce tick numbers and risk of infection
 - Key is to integrate control practices

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despite adequate knowledge about the risk of infection, many people do not follow behaviors to reduce this risk

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Landscape modifications

- Ticks need high humidity
- Increase areas of sunlight
- Relocate play equipment... high risk are lawns next to woods

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- Increase areas of sunlight
- Relocate play equipment... high risk are lawns next to woods
- Create 3+ ft wood chip barrier
- Keep lawn mowed
- Deer fencing

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Perimeter insecticide applications



- **Commercial...**
tree/lawn care companies
- **Do-it-yourself...**
hose-on application, coarse spray directed to the ground, leaf litter, and low shrubs; granular application




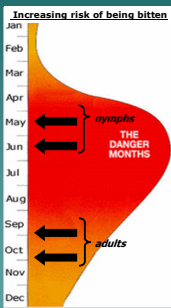









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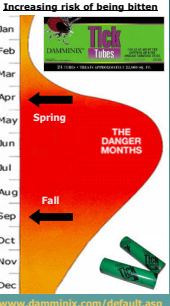











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Control ticks on reservoirs & deer






- **Damminix[®]...** permethrin[®] treated cotton balls
Place near mice nesting areas... wood/brush piles, stone walls, rock piles, etc.

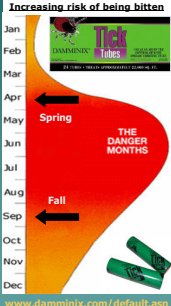











www.damminix.com/default.asp
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Place near mice nesting areas... wood/brush piles, stone walls, rock piles, etc.
- **4-poster deer feeder (USDA)**






Corn reservoir



Paint rollers containing permethrin



90% of ticks on head/neck

www.crdaniles.com/dandux/outdoors.htm
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Protect yourself



Avoid risky behaviors...
leaf litter, deer paths, logs/stone walls, untreated pets, bird feeders

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Protect yourself



Avoid risky behaviors...
leaf litter, deer paths, logs/stone walls, untreated pets, bird feeders

Wear light colors...
long pants, shirt, hat, tight-weave socks over cuffs (tape)



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Protect yourself



- Avoid risky behaviors...**
leaf litter, deer paths, logs/stone walls, untreated pets, bird feeders
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long pants, shirt, hat, tight-weave socks over cuffs (tape)
- DEET®...skin & clothing**
- Permethrin...clothing, ~ 4 weeks (0.5%)**




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- Do tick check...hairline & where clothes fit tightly**




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- Do tick check...hairline & where clothes fit tightly**
- Shower immediately**




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- Shower immediately**
- Keep outdoor clothes in the garage**




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Protect yourself



- Avoid risky behaviors...**
leaf litter, deer paths, logs/stone walls, untreated pets, bird feeders
- Wear light colors...**
long pants, shirt, hat, tight-weave socks over cuffs (tape)
- DEET®...skin & clothing**
- Permethrin...clothing, ~ 4 weeks (0.5%)**
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- Insect Shield™ (Buzz Off)...**
permethrin treated outdoor apparel by Exofficio, etc.




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washing with detergent will NOT kill ticks; clothes dryer at high temperature will

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Protect pets from ticks...

unprotected pets = high risk to children and adults

- **Frontline: Top Spot®, Top Spot® Plus, and Liquid®**
 - ticks and fleas (Plus), dogs and cats
 - 1 month tick protection (systemic)
 - Also monthly liquid application in/on ears (cats)




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pets should be inside or outside

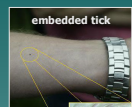


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If "@%it" happens




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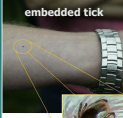


If "@%it" happens

- Use clean tweezers or tick removal tool
- Grasp the tick close to skin
- Slowly and steadily pull upward until the tick releases

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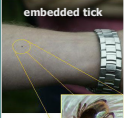


If "at" happens

- Use clean tweezers or tick removal tool
- Grasp the tick close to skin
- Slowly and steadily pull upward until the tick releases
- Never...use alcohol, Vaseline, match, etc. May trigger injection of salivary fluids and disease-causing microbes!
- Save tick to show physician
- Tick testing (NJ Labs., 1-877-Tick Test or 732-249-0148)

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unattached ticks can survive indoors for days


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Thank you and...




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Helpful Lyme disease links



- Lyme Disease Association of Southeastern PA (LDASEPA): www.lymepa.org/
- The National Lyme Disease Association (LDA): www.lymediseaseassociation.org
- ILADS - the International Lyme and Associated Diseases Society: Professional medical society about Lyme disease. www.ilads.org
- Columbia University Lyme Disease Research: www.columbia-lyme.org
- Physician referrals call LDASEPA at 610-388-7333 or email Lymepa@lymepa.org
- Find a support group: www.Lymenet.org
- IGeneX, Inc., Palo Alto, California: (lab/explanations of tests) www.igenex.com
- MDL, New Jersey: <http://www.mdlab.com/html/home.html> (testing lab)
- The Centers for Disease Control and Prevention (CDC): <http://www.cdc.gov/ncidod/dvbid/lyme/index.htm>

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