

## **Education is the Best Prevention for Lyme Disease & Co-Infections Jan 2011**

### ***Background***

For the past 34 years I have had the joy of working as a Ranger (14+ years w/ EBRPD & 20 years with EBMUD). During this time I have come in contact with cougars, wild pigs, coyotes, bobcats, “buzzworms” (rattlesnakes), black widow spiders and yellow jackets.

I had the opportunity to see a number of Mountain Lions during the 14 ½ years I worked for East Bay Regional Park District at Sunol/Ohlone Wilderness as a Ranger and 13 ½ years living at the remote & primitive Camp Ohlone Ranger Residence. To give you an idea how remote this area is look on a map where Alameda Creek bisects the Alameda and Santa Clara County line. The residence was without electricity or phone and the nearest neighbor was 6.5 miles away.

I was fortunate enough to see 13 lions in that period and kept records of sightings by others. In 1984 a lion killed a deer 50 feet from the front door & 30 feet from a penned goat. I will never forget that lion’s scream as I opened the front door of the residence at 2:00 AM. It made the hair on the back of my neck stand up.

There was a large “tom” that was seen near the park headquarters often, & a chocolate colored female near “Goat Rock”, a young lion at Lake Del Valle, and a female with a cub near Mission Peak Regional Preserve. I estimated by reports & sightings that there were 4 lions at one time along the 30 mile segment of the Ohlone Wilderness Regional Trail. In 1990 right before my wife, Stephanie and I move to the Mother Lode we heard, on a regular basis, a female lion calling to her cub across Alameda Creek (near the residence). In all those years I never felt threatened by lions.

One of our duties as Rangers at Sunol Wilderness was to relocate Western Rattlesnakes *Crotalus viridis* that park visitors or staff observed in the picnic area and campground. We would capture these snakes with a snake stick put them in a 3 gallon bucket with a secure lid and I would release them on the way home to Camp Ohlone. We would relocate between 6 and 24 buzzworms a year.

There was a 15 acre walnut orchard at Camp Ohlone that provided a food source for huge colonies of ground squirrels. Where there are rodents there are predators. In a survey 11 rattlesnakes were recorded in 1 acre of this orchard. Needless-to-say we had on average 3 rattlesnakes per year in the yard at the residence. In all those years I or any of the staff were bitten by rattlesnakes but Rangers did and more so at Lake Del Valle respond to park visitors who had be bitten by rattlesnakes. In most cases the victim was intoxicated, was bit in the thumb or the index finger and admitted to holding the buzzworm.

Bees, along with dogs & deer, are responsible for more deaths each year than sharks, mountain lions, poisonous snakes, & spiders combined. For example, three times as many people die from lightening strikes each year as the total number of people killed by mountain lions in North America during recorded history. Bees, dogs, & deer kill between 100-200 Americans each year. Rarely do we hear about this, as Mountain Lions and Rattlesnakes are feared more and are portrayed as the villains. On the other hand in the old Walt Disney Television programs we (that are old enough to remember) saw wildlife doing everything from wearing pajamas to driving model “A” cars.

By far one the most dangerous animal in the woods is the nymphal Western blacklegged tick. Every year I receive phone calls or emails from 6-24 individuals who have been bitten by a Western Black-legged tick and want advice on what to do, have symptoms of Lyme disease or want the name of a Lyme Literate Doctor in California (of which there is just a handful). I know of many folks in Calaveras and Amador County who have Lyme disease. ). I received calls from Jordon Fisher-Smith (who appear in the film "Under Our Skin") & told him that the symptoms he described were suspect for Lyme & then convinced him to see a Lyme Literate Doctor. Since the early 1990's I have received requests and done Lyme disease in California trainings for Volcano Telephone Company, P G & E, EBMUD Staff & Volunteers, and at the California State Trail Conference and the National Trails Conference. I live in the Sierra Nevada Mother Lode in a small town of under 200 residents. In 2007, 4 cases of Lyme disease in Calaveras County (which has a population of about 46,000) were reported to the Calaveras County Health Department. I am personally aware of 7 individuals (not including Stephanie & I) within ¾ mile of our home that are being treated for Lyme.

### **What is Lyme disease?**

- In the early 1970's, a mysterious ailment was discovered among children living around the town of Lyme, CT. What was first diagnosed as isolated cases of juvenile arthritis eventually became known as Lyme disease, an illness triggered by spiral-shaped bacteria, similar to the microorganisms that cause syphilis.
- Lyme borreliosis can attack the brain, nervous system, joints, the heart, the G.I. system, or the urinary tract and the strain on the immune system can cause other sicknesses to manifest more easily. It can entrench itself deeply within tissue, often beyond the reach of antibiotics, can migrate with impunity and cause multi-system illness that is often baffling to physicians.
- Difficult to test accurately, tens of thousands of people go undiagnosed—or misdiagnosed with such conditions as fibromyalgia, chronic fatigue, autism, MS and ALS. The Centers for Disease Control admits that more than 200,000 people may acquire Lyme disease each year, a number greater than AIDS, West Nile Virus, and Avian Flu combined. (49)
- And yet, the medical establishment—with profound influence from the insurance industry—has stated that the disease is easily detectable and treatable, and that “chronic Lyme” is some other unrecognized syndrome or a completely psychosomatic disorder. Lyme disease is one of the most misunderstood and controversial illnesses of our time.

### ***Prevalence***

- Of all tick-borne disease in California, 94-95% is Lyme. (7)
- Black legged nymphal ticks, about the size of a poppy seed, account for most of the Lyme disease transmission in California. (8)
- Lyme disease is the most common tick-borne disease in America. (52)
- Reported Lyme cases have more than doubled since 1991. (53)

- In 2007 there were 27,699 Lyme cases reported to the CDC, but the actual number of new cases could be higher than 200,000, a number greater than AIDS, West Nile Virus, and Avian Flu combined. (54)
- Undercounting of the CDC Lyme cases are due to inaccurate tests (55), the inherent flaws of a passive reporting system, and fear of medical board scrutiny by physicians treating Lyme disease.

### ***Transmission***

- Western black-legged nymphal ticks, about the size of a poppy seed, account for most of the Lyme disease transmission in California. The infection rate in nymphs is between 1-41%. (8, 66)
- There are 47 species of ticks in California and they carry a number of infectious diseases: Lyme disease, Colorado tick fever, human granulocytic ehrlichiosis, human monocytic ehrlichiosis, anaplasmosis, *Bartonella henselae*, Rocky Mountain spotted fever, tularemia, and human Babesiosis. (6, 72)
- Of these 47 species in California 9 species that can carry disease but only 6 species that attach to humans with any regularity. (36, 71)
- Individuals can be infected with Lyme, Ehrlichiosis, *Bartonella*, Babesiosis and *Mycoplasma fermentans* combinations from the bite of one infected Western black-legged tick. The Western black-legged tick may harbor at least a dozen microbes. (35)
- The bacterium that causes Lyme disease, *Borrelia burgdorferi* (*B. burgdorferi*), is most commonly transmitted to humans through the bite of an infected western black legged tick. (56)
- Because the bite is painless, most people don't realize they have been bitten. (66)
- Lyme disease, as well as other tick-borne infections, is thought to be transmitted from an infected mother to a fetus through the placenta during pregnancy, possibly resulting in complications or stillbirth. (57)
- Many Lyme practitioners believe that *B. burgdorferi* can be transmitted sexually, though no studies have conclusively proved this theory.

### ***Key Facts for California***

- People who just spend time outside are at risk for Lyme disease and other tick-borne co-infections. (21)
- Human risk of exposure to *B. burgdorferi* is restricted largely to activities that take place in oak woodlands, (68) and as such, personal-protective measures are most apt to reduce Lyme disease risk in California. (69)
- In one study, about 60% of 967 ticks that had attached to people were identified as western blacklegged ticks. Two-thirds of those were adult ticks and 32% nymphal ticks. Thus, the western black-legged tick is by far the most common human-biter in the Far West. (71, 72)
- The Western Black-legged tick may harbor at least a dozen microbes. (35) It is found in 56 of the 58 California counties and Lyme infected ticks have been found in 42 counties. (48)

- Sitting on logs is the riskiest behavior, followed, in descending rank, by gathering wood, sitting against trees, walking, stirring or just sitting on leaf litter. (40)
- Nymphs are found in April-July in moist leaf litter in oak woodland (7)
- In California questing nymphal Western Black-legged ticks tend to peak in abundance during May (67)
- Most cases of Lyme disease arise from tick exposures in late spring and early summer. (7,67)
- Adult ticks are often found on trails, 80-90% are found in shaded moist ecotones (north facing slopes) on the uphill side of a trail in October to June, and peak in December -February. (7)
- In California the primary reservoir hosts for Lyme disease are birds on the west slopes of the Sierra (30) the pack rat in the north coast area (5) and the western gray squirrel in dense oak woodland in the rest of the state (67)
- Proper tick removal requires patience. It is more important to get prompt medical treatment than to get the tick tested. (19)

### ***Symptoms***

- Lyme disease is caused by a microorganism related to syphilis and presents with similar symptoms. Early symptoms of infection can include fever, headache, fatigue, and a “bull’s-eye” or variably shaped skin rash called erythema migrans. Late stage Lyme symptoms can include a stiff neck, joint inflammation, sleep disturbances, and neurological issues such as shooting pains, numbness or tingling in the hands or feet, and problems with concentration and short-term memory. (58)
- Contrary to popular belief, only 35-59% Lyme patients present with a bulls-eye rash, the flat or slightly raised red circular rash at the site of the tick bite. (59)
- 70% of these rashes are atypical and do not occur on the bite site. (5,41)
- See symptom checklist on page 11 and 12.

### ***Testing***

- The current state of laboratory testing for Lyme disease is very poor. (51)
- Specimens should be sent to reliable labs. How does one find out about reliable labs? Research studies in the 1980s revealed that the amount of inter-laboratory agreement was fair at best. (71)
- According to a recent Johns Hopkins study, the IDSA-endorsed two-tiered testing procedure misses 75% of positive Lyme cases. (51)

### ***Diagnosis***

- The Infectious Diseases Society of America (IDSA) guidelines appear to be constructed in a manner that limits diagnosis and treatment and favors HMO’s and insurers. (51)
- Most health care providers follow Lyme disease guidelines issued by the Infectious Diseases Society of America (IDSA). These guidelines do not acknowledge or address the chronic form of Lyme disease. They only address the acute or early-stage Lyme disease. The IDSA guidelines are a subject of an antitrust investigation initiated by the Connecticut Attorney General in 2006. The guidelines appear to be constructed in a manner that limits diagnosis and treatment and favors HMO’s and insurers. (50, 51)

- In a survey of 3,600 individuals that contracted Lyme in California only 16% were diagnosed within 4 months of becoming infected with Lyme. The remainder were diagnosed far later when Lyme disease is much more difficult to treat. It took more than 6 years for 35% to be properly diagnosed. Only 13% were diagnosed using the IDSA-recommended two-tiered Lyme testing approach. 20% were diagnosed by western blot using CDC criteria, and 42% were diagnosed clinically with supporting lab tests that did not use CDC surveillance criteria. 90% had difficulty or extremely difficulty obtaining treatment from a knowledgeable physician to treat Lyme disease. 51% had traveled more than 100 miles to obtain treatment and 53% had been forced to travel out of state to obtain care. 54% had been treated and failed treatment under IDSA protocols. A resounding 81% stated that they would not consider being treated under IDSA protocols. More than 60% of respondents who failed to improve under IDSA protocols improved with additional treatment. 41% of patients were not able to afford the medical care they needed. 88% had to cut back on work, school and household activities. 50% either had to quit work or school due to illness and another 11% went from full time to part time work or school. (73)
- A Lyme diagnosis should be based on clinical signs, symptoms, history, exposure risk, and course of illness. Tests play only a supportive role, and according to the CDC, the NIH, and the FDA, a Lyme diagnosis should not be ruled out based on tests alone. (50)
- Lyme disease is the great imitator and should be considered in the diagnosis of Fibromyalgia, Chronic Fatigue Syndrome, Multiple Sclerosis, Alzheimer's disease, Parkinson's disease arthritis, ADHD, mental illness, seizure and neuralgic disease, and difficult-to-diagnose multisystem syndromes. (2)

### ***Treatment***

- Lyme disease can be treated in the early stage but once an individual is infected with Lyme disease, he/she has a 6-8 week window of opportunity to receive optimal treatment to prevent chronic problems. (12)
- Treatment costs increase with delayed diagnosis. On average it takes 22 months and 7 doctors before an individual infected with Lyme is diagnosed correctly. (12)
- *B. burgdorferi* is a slow-growing, evasive bacterium that often requires longer courses of antibiotics if not treated in the early stages. Antibiotic treatment for only 14-21 days results in a 26-50% failure rate. (60)
- Persistence of *B burgdorferi* despite antibiotic treatment has been demonstrated by post treatment isolation of the bacteria. (61)
- Both clinical and study evidence show that long-term antibiotics can significantly improve the quality of life for patients with chronic Lyme disease. The potential harm in letting a persistent Lyme infection go untreated far outweighs the potential side-effects of long-term antibiotic use. Five uncontrolled studies support longer treatment approaches. (62)
- Upon removal of an embedded tick, a single dose of Doxycycline is NOT an effective means of preventing Lyme disease. CDC immunologist Nordin Zeidner, chief of the CDC's Vector-Host Laboratory, found this dosage to be effective only 20 to 30 percent

- of the time in mice. Antibiotic treatment for only 14-21 days results in a 26-50% failure rate (63)
- Expert medical opinion (lyme literate doctors) should be sought since ticks can transmit a number of coinfections and most doctors are not competent to deal with these. (19, 50, 51)
  - If you contract Lyme disease you are on your own. Expect to pay for competent help outside of your health care plan. There are only a handful of Lyme Literate doctors in the state. In a survey of 3,600 individuals that contracted Lyme in California 41% of patients were not able to afford the medical care they needed. 88% had to cut back on work, school and household activities. 50% either had to quit work or school due to illness and another 11% went from full time to part time work or school. My medical insurance, Kaiser Permanente, is provided by my employer. Kaiser using the ISDA guidelines has decided that my wife no longer, has Lyme disease so in 2009 we paid \$25,000 out of pocket for her treatment. Of course they offer no explanation to her present condition other than being permanently disabled. (19, 51,73)

***Vaccines***

- The only FDA-approved Lyme vaccine, called Lymerix, was withdrawn from the market by the manufacturer in 2002 before adequate Phase IV safety data could be obtained. Recipients required 3 shots in the first year in order to achieve 76% effectiveness in preventing Lyme disease. (64)
- Vaccine recipients reported a number of adverse effects to the CDC/FDA Vaccine Adverse Effects Reporting System. Based on legal action aimed at Lymerix, it is likely that Phase IV studies would have shown significant risks in a broader population if the Lyme vaccine had not been withdrawn by the manufacturer. (65)

***PREVENTION ~ Reduce Your Chances of a Tick Bite***

***Western Black-legged Tick***

- In its unfed state, the nymph is about the size of a poppy seed (1/25 inch long). It has four pairs of legs, a dark brownish black plate on its back, and a light-colored, translucent abdomen. Once they attach to a person, the nymphs feed for about 4-5 days before they detach and drop off. They molt to the adult stage weeks or months later. (71)
- The unfed adult female is about 1/8 inch long, has long mouthparts, brownish-black legs, a dark brownish-black plate that covers the anterior half of its back, and a reddish-orange abdomen. Attached females feeding on a host may expand to 3/8 inch in length, or longer. At 1/10 inch, adult males are smaller than females, somewhat oval shaped and brownish black. (71)

***Know Where the Ticks Occur:***

- The nymphs abound in hardwood forests or woodlands carpeted with leaf litter or fir needles, mixed chaparral, madrone forest and redwood forests but they are much less abundant or accessible in more open habitats such as grassland. (31, 71)
- The adults are commonly encountered in open grass or chaparral (brushlands), in fringe areas where two vegetation types merge (e.g., where grassland abuts with either brush or forest); and along the margins of trails (especially in shaded moist

ecotones (north facing) uphill vegetative borders of hillside trails) in parklands and wildlands, in semirural communities, and in some suburban areas that support surrounding domestic populations of deer and other wildlife. (71)

- Adults climb low vegetation, such as grass or brush, and lie in wait for hours or days while seeking their preferred medium- to large-sized hosts, such as rabbits, dogs, or deer. Consequently, humans incidentally encounter adult ticks during recreational activities or working in various types of grassland or brushland habitats. (71)
- In one study, about 85% of the adult ticks that infested the clothing of people walking through grassland did so between the ankle and the knee. (71)

***Know When Ticks Occur:***

- In northern California, people appear to be most at risk in spring until about midsummer, especially from April through July, when the nymphs are abundant. The questing nymphal Western Black-legged ticks tend to peak in abundance during May, National Lyme Disease Awareness month. (7, 67, 71)
- People are more apt to be exposed to the adult ticks at certain times of day (e.g., early morning/late afternoon on clear, warm days) because adult tick activity is positively associated with relative humidity and negatively associated with temperature. Adult ticks seek their hosts from late fall to spring, but are most active during winter. (71) November in the month I receive the most calls about attached adult ticks. (19)
- Thus, simply minimizing or avoiding prolonged contact with either grass or brush when these conditions apply will greatly reduce one's exposure to the adult ticks.

***Personal Protection Equipment***

- Reduce your exposure by avoiding areas where and when ticks occur.
- Wear light-colored long pants and long sleeves so you can easily see any ticks.
- Tuck shirt into pants and tuck pants into socks.

***Keep Ticks at Bay by Using Pesticides in a Responsible Manner***

- Follow the manufactures directions.
- Almost any insect repellent works for some people, but only a few work for most.
- Repellents applied to the skin containing DEET or Lemon Eucalyptus oil applied every 7 hours have been rated "good" for mosquitoes & ticks. DEET has been associated with human case histories of neurological damage and even death, and products greater than 40% were restricted in some states. It is recommended that 25% or less DEET is applied on exposed skin of adults and 10% on Children. The Centers for Disease Control recommends that consumers avoid products that mix sunscreen with DEET insect repellent. Because sunscreen needs to be applied heavily and often and by doing so with this type of product you could expose yourself to higher concentrations of DEET unnecessarily. (70,74)
- The Centers for Disease Control lists Lemon Eucalyptus Essential Oil as an organic product as an effective repellent for ticks that can carry Lyme disease. Lemon Eucalyptus Essential Oil is not recommended for children under 3. A commercial product called Repel Lemon Eucalyptus Repellent, from Spectrum Brands. (74, 75)

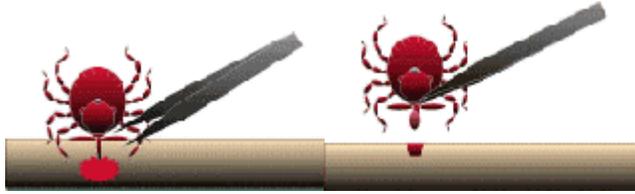
- Spraying pesticides containing DEET such as “Off” or “Cutters” on your skin is not as effective as garments treated with Permethrin products. You would need to spray your whole body every 7 hours with pesticides containing DEET or Lemon Eucalyptus oil to have the same effectiveness as insect repellent clothing or your clothing that you have pretreated with Permethrin. (19,70)
- **Spraying pesticides containing DEET on clothing is NOT effective against ticks.** In a field test conducted by the Minnesota Insect-Borne Disease Education Council in Jay Cook State Park in Northern Minnesota, permethrin products were found to out-perform the DEET-containing tick repellents. A walking shoe was sprayed with Duranon 0.5% permethrin: three weeks later it was tested against its matching mate that was sprayed with Deep Woods Off 35% DEET. The ticks that made contact with the Duranon shoe immediately rolled up and dropped off. The ticks on the soaking wet DEET saturated shoe continued to crawl unimpaired. (70)
- **Recommendations:** Insect repellent clothing is now available – clothing that comes pretreated with repellent that stays in the garments for numerous washes. Insect Shield(R) apparel and accessories are available now from top brands such as L.L. Bean, Orvis, ExOfficio, REI, Sloggers, RailRaiders, Outdoor Research, Tilley, Zorrel, Carolina Manufacturing, Buff and others. The University Of North Carolina Gillings School Of Public Health reported that the incidence of tick attachments was reduced by 93 percent among workers wearing Insect Shield Repellent Apparel. The report was published online March 11, 2011 in the journal Vector-Borne and Zoonotic Diseases. Another option is to spray one pair of long pants, one long sleeve shirt and a ball cap with a repellent containing Permethrin (at least 2 hours before use) and use an identifying mark on the inside of the garments to keep track of treatments. The manufacturer claims the treatment should remain effective for 6 weeks or 6 launderings of the garment. This has been my experience also. (19)
- Insect Shield(R) apparel, Repel Lemon Eucalyptus Pump Insect Repellent and Sawyer Permethrin Pump Spray are available at REI.

### ***Perform Tick Checks***

- Ticks, especially nymphal ticks, are tiny. Find and remove them before they bite. Inspect your clothing and exposed skin for ticks often when outdoors in likely tick habitats. Ticks may attach anywhere on the body, but on fully clothed persons they often attach to the scalp, behind an ear, or to an arm or leg. Pay particular attention to these areas when examining yourself or others. Furthermore, examine your bedding for up to several days after exposure to tick-infested habitats for presence of detached, fed ticks. Nymphs of the western black-legged tick, once attached to human skin, are easily overlooked because of their small size and sometimes hidden feeding sites (such as the scalp). However, fully satiated nymphs have been observed to detach from people during the night within as few as 3 days after exposure to ticks, and they are much easier to detect in a bloated state while digesting their blood-meal among bedclothes, including one’s pillow.

### ***What to Do If You Are Bitten***

- If you find an attached tick, remove it immediately. Prompt removal of infected ticks can prevent Lyme disease and other tickborne diseases.
- Use fine-point tweezers or a special tick-removing tool. Grasp the tick as close to the skin as possible.



- Proper tick removal requires patience. Pull the tick straight out with steady, even pressure.
- Do not jerk or twist the tick as you extract it. Do not apply alcohol, fingernail polish, heat from a lit match, or petroleum jelly to the tick; these methods are completely ineffective as this causes the tick to excrete or regurgitate out bacteria.
- Avoid squeezing the tick, breaking it, or allowing any blood to remain on your skin.
- Remove any mouthparts that break off in the wound (consult a physician if necessary). The mouthparts may be contaminated with other bacteria that occasionally cause secondary infections, but the mouthparts alone will not transmit Lyme disease spirochetes.
- Whenever an attached tick is removed from a person, it should be saved for later identification in case the person experiences an illness within a month.
- Place the live tick in a small plastic bag or vial with blades of grass, leaf, or moist (not wet) piece of tissue.
- Label the bag with your name, date, site of bite and how long tick was attached.
- Have the tick identified and tested by a commercial laboratory, or by a local health department or mosquito and vector control district if they provide such services.
- If the tick is sent to a lab to be tested it takes 7-10 from when the lab receives it until you receive results. (19)
- Wash your hands, disinfect the tweezers and bite site (e.g., with povidone-iodine).
- Educate yourself about tick-borne diseases and consult a doctor to see if treatment is warranted.
- It is more important to get prompt prophylactic treatment than to get the tick tested because the Lyme bacteria may spread widely in the body, including to the brain, within hours/days.

### **Considerations for Prophylactic (Preventive) Treatment**

- The tick infection rate in the area where you acquired the tick. An area may still be labeled as “no risk” despite lack of scientific studies.
- The relative risk of transmission, depending on whether the tick was a nymph or adult, duration of attachment and how it was removed.
- Whether the tick tested positive for a tick-borne infection.

- The Lyme germs may spread widely in the body, including to the brain, within hours/days.
- The cost of prophylactic treatment vs. risk of infection.
- The risks and benefits of prophylactic treatment vs. risks of infection.

### ***Conclusion***

- 1) Lyme disease is one of those horrible diseases that people only really understand AFTER they or someone they love gets it. It would be much more effective for all of us to know about it BEFOREHAND, since it can afflict anyone who spends time outdoors and we should be aggressive about prevention.
- 2) It is a travesty that 200,000 Americans are infected annually with this disease because of the Infectious Disease Society of American guidelines which are constructed in a manner that limits diagnosis and treatment and favors HMO's and is fed by the Health Insurance Industry greed. (49, 50, 51). After 30 some odd years of deregulating industries the power and money has now been concentrated in the hands of too few giants and many of our legislators pay them homage & do their bidding as that is where their campaign financing arises.
- 3) If individuals who contracted Lyme disease were diagnosed early the treated costs would be extremely less expensive. Widespread denial of Lyme disease leaves undiagnosed and untreated patients to progress to Chronic Lyme disease. Costly, long-term antibiotic treatment is common in cases with persistent clinical symptoms such as Chronic Lyme disease. (9, 12, 21, 66)
- 4) Today, many of those untreated will suffer chronic debilitating illness. Some unknowingly will pass the disease on to their unborn children. Many will lose their livelihoods, and still others, their lives. (21, 49, 57)
- 5) Ignorance, lack of concern, and under reporting continues to complicate the problems of recognized Lyme disease the most common of the vector-borne diseases in the U S. (21)
- 6) Education is the most important way to reduce the risk and increase the awareness of tick-borne diseases. Personal prevention is the most effective way to reduce your chances of being bitten by an infected nymphal Western Black-legged tick, which accounts for most of the Lyme disease transmission in California. (8, 9, 69, 70)

### ***Resources***

**California Lyme Disease Association (CALDA):** Lyme Literate Doctor referral, Research, Support Groups, Resources, Lyme Times Publication, links, etc [www.lymedisease.org](http://www.lymedisease.org)

**International Lyme & Associated Disease Society** Position papers & practice guidelines, latest diagnostic methods & treatments in the management of tick-borne disease. [www.ilads.org](http://www.ilads.org)

If you would like to see a clip, see when & where it will be shown or purchase a copy of the Lyme Disease Documentary film “**Under Our Skin**”, go to <http://www.underourskin.com>

Tick Management Handbook: [www.caes.state.ct.us](http://www.caes.state.ct.us)

SYMPTOM OR SIGN	CURRENT SEVERITY				CURRENT FREQUENCY				
	NONE	MILD	MODERATE	SEVERE	NA	NEVER	OCCASIONAL	OFTEN	CONSTANT
Hearing: buzzing, ringing, decreased hearing									
Increased motion sickness, vertigo, spinning									
Off balance, "tippy" feeling									
Lightheadedness, wooziness, unavoidable need to sit or lie									
Tingling, numbness, burning or stabbing sensations, shooting pains, skin hypersensitivity									
Facial paralysis-Bell's Palsy									
Dental pain									
Neck creaks and cracks, stiffness, neck pain									
Fatigue, tired, poor stamina									
Insomnia, fractionated sleep, early awakening									
Excessive night time sleep									
Napping during the day									
Unexplained weight gain									
Unexplained weight loss									
Unexplained hair loss									
Pain in genital area									
Unexplained menstrual irregularity									
Unexplained milk production; breast pain									
Irritable bladder or bladder dysfunction									
Erectile dysfunction									
Loss of libido									
Queasy stomach or nausea									
Heartburn, stomach pain									
Constipation									
Diarrhea									
Low abdominal pain, cramps									
Heart murmur or valve prolapse?									
Heart palpitations or skips									
"Heart block" on EKG									
Chest wall pain or ribs sore									
Head congestion									
Breathlessness, "air hunger", unexplained chronic cough									
Night sweats									
Exaggerated symptoms or worse hangover from alcohol									
Symptom flares every 4 wks.									
Degree of disability									

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**DIAGNOSTIC HINTS AND TREATMENT GUIDELINES FOR LYME AND OTHER TICK BORNE**  
**ILLNESSES** by **JOSEPH J. BURRASCANO JR., M.D.** Copyright, September, 2005. For the complete guidelines, go to  
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73. Johnson, Lorraine **2009 California Lyme Disease Association Survey**: This survey are the results from 3,600 individuals to 30 questions about Lyme disease and was presented at the 2009 the IDSA Lyme hearing. Lorraine Johnson, JD, MBA is an attorney advocate on issues related to the medico-legal and ethical aspects of Lyme disease and has published articles on this topic. She earned her JD from Loyola University and an MBA from USC. She is the Chief Executive Officer of the California Lyme Disease Association, which oversees 46 internet state groups, serves on the professional advisory board of the national Lyme Disease Association, which represents 35 groups in 23 states. She is also a director and an officer of ILADS and a member of the Cochrane Consumer Network for Cochrane evidence-based reviews.
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