ONCE BITTEN...

All it takes is one bite from a bacillus-carrying deer tick to infect you with the debilitating and often dangerous Lyme disease. Here are the facts on this mysterious ailment, and the holistic and other treatments that have helped counter it.

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LYME DISEASE

HOW TO AVOID, DETECT AND TREAT THIS DANGEROUS TICK-BORNE PLAGUE

Ronald L. Hoffman, M.D.

SERIES EDITORS: **RICHARD A. PASSWATER, Ph.D.** is the author of Selenium as Food and Medicine and Cancer Prevention and Nutritional Therapies. **EARL MINDELL, R.Ph., Ph.D.** is the author of Shaping Up with Vitamins and Unsafe at Any Meal.

A TICK-BORNE PLAGUE

Lyme disease is the most common bug-borne disease in the United States. If diagnosed and treated early in an otherwise healthy individual, it may be no worse than a bout of the flu. However, because of the difficulties of accurate diagnosis and the impaired immune systems of many of its victims, a neglected Lyme infection can result in serious complications affecting the heart, the joints, the brain, and the nervous system. Moreover, the traditional "cure," heavy-duty antibiotic therapy, can cause debilitating side effects.

This invaluable booklet, written by a leading doctor of nutritional medicine, tells you everything you need to know to protect yourself from this dreaded infection. Dr. Hoffman describes the course of the disease, standard diagnostic procedures, and treatment options. Most important, he discusses the specific nutrients, vitamins, and minerals that can rebuild the immune system and soften the effects of antibiotic therapy.

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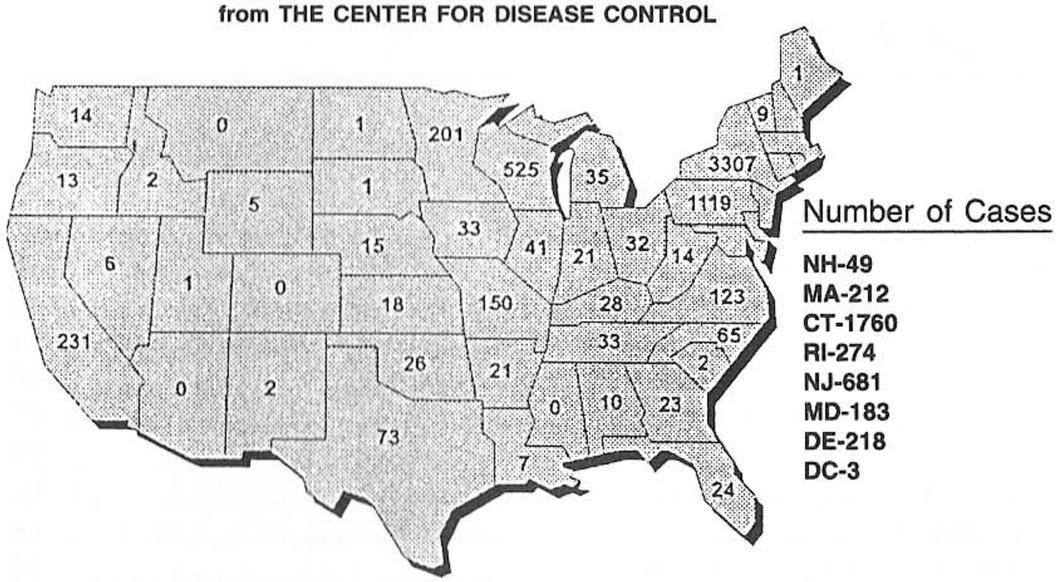

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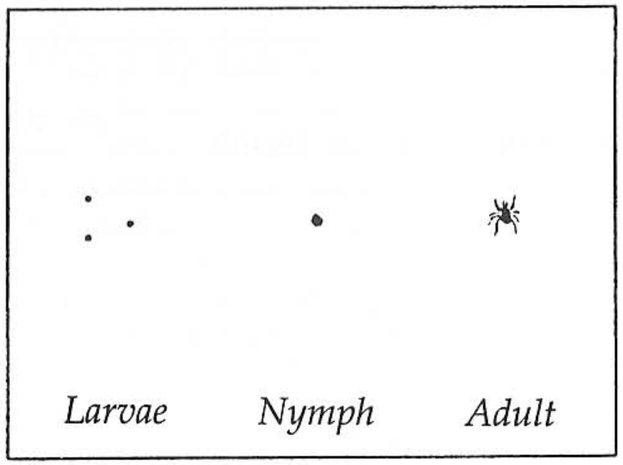

INTRODUCTION: A DETECTIVE STORY

Since the mid-1960s, Polly Murray, a mother of four living in Old Lyme, Conn., hadn't been feeling at all well. She suffered from rashes, headaches, swollen joints, muscle stiffness, and overwhelming tiredness. Over a period of ten years, she saw a number of doctors, none of whom were able to help her. Many of them diagnosed her problems as psychosomatic, and recommended that she see a psychiatrist. But by 1975, her whole family had fallen ill: Her older son had developed facial palsy, her husband was on crutches because of painful, swollen knees, and her two younger sons had the same swollen, inflamed knee joints. Then one of the boys was diagnosed with juvenile rheumatoid arthritis, a rare autoimmune disease that strikes about five children in 100,000. Polly called the State Health Department, but they could not make sense of the strange mix of symptoms. However, one of Polly's friends, Judy Mensch, was aware that four other children in the same area had been diagnosed with this rare disease, and that nearly twenty were suffering from similar problems. When Judy called the State Health Department to report this strange statistical aberration, the Department swung into action.

Dr. Allen C. Steere, a rheumatologist from Yale-New Haven Hospital, was called in to investigate. Within a year, Dr. Steere had discovered more than fifty cases of related illness within the small community of Lyme, perched beside the Connecticut River. Many suffered from arthritis and painful, swollen joints, or from headaches and neurological symptoms. About one quarter of them remembered having a strange rash, shaped like a bulls-eye, with a raised, red ring and a clear center, at about the time their symptoms began. Since the cause of the illness was as yet unknown, Dr. Steere and his colleagues called it simply, Lyme disease.

Still, there was a suspect. The rash reminded Dr. Steere of the rash caused by the bite of the sheep tick in Europe, which had been observed since 1900, especially in Scandinavia. Within a few years, Dr. Steere saw several new patients who remembered being bitten by a tick, and one of them had saved the tick. It was a deer tick, of the species *Ixodes dammini*, and it turned out that this kind of tick

was about thirty times more prevalent in the area around Lyme, where the illness was rampant, than on the other side of the Connecticut River.

Steere and others suspected that the deer tick (which is much smaller than the common dog tick) was transmitting some kind of virus or infectious agent. But it was not until 1982 that Dr. Willy Burgdorfer, a leading authority on ticks, discovered the corkscrew-shaped bacteria, of the type called spirochetes, in the bodies of deer ticks collected on Shelter Island, where Lyme disease was also rampant. The spirochete was subsequently named *Borrelia burgdorferi*, after its discoverer. And sure enough, the bacteria were found in the rashes, and in the blood and spinal fluid of Lyme disease patients.

WHAT IS LYME DISEASE?

Lyme disease is a complex, potentially dangerous, and potentially chronic illness that begins with infection by the *Borrelia* bacterium, which is transmitted by several species of ticks to animals and people. The initial infection can cause flu-like symptoms, including headache, sore throat, stiff neck, fever, muscle aches, fatigue, and general malaise. In 25 percent or more of cases, there is a typical bulls-eye rash, with a raised, swollen reddish ring that expands outward from the tick bite. This rash is unique to Lyme disease. If diagnosed early, the infection can be treated with a course of antibiotics, and no further symptoms will appear. Some people seem to overcome the initial infection, even if not treated, and develop no further complications.

However, Lyme disease poses two special risks. First, the initial infection may evade diagnosis. The ticks that transmit the disease are easily missed, since they may be no larger than a poppy seed, or the period at the end of this sentence, and the bite is not painful. The characteristic rash occurs in only one quarter of cases, and the initial symptoms resemble flu or a passing viral infection, and generally subside on their own, whether treated or not.

Second, if it is not diagnosed and treated early (within weeks or months), the infection can result in serious complications. Advanced Lyme disease can affect the heart, the joints, the brain, and the

nervous system and cause serious, life-disrupting and painful illness that is difficult to diagnose, difficult to treat, and sometimes evades cure altogether.

The initial symptoms of infection with Lyme disease generally subside within a few weeks. But weeks or months later, new, unrelated symptoms may appear, including arthritis, heart problems, facial palsy, muscle pain, extreme fatigue, headaches, memory loss, and depression. These symptoms can be intermittent, lasting from a few days to several months, and disappearing for long periods of time. In chronic cases they can last for years. Symptoms may switch from one part of the body to another, shifting from joint to joint, from muscle pain to headaches and neurological symptoms. They can mimic a variety of other illnesses, from rheumatoid arthritis to multiple sclerosis. Unfortunately, there is no definitive test to establish the presence of Lyme disease. There is a blood test that measures the reaction of the immune system to the *Borrelia* spirochete, but results are often inconclusive, and can show up as negative even in people who have the disease. The variety of symptoms, and the lack of a positive blood test, can make advanced stages of the disease quite difficult to diagnose.

Advanced Lyme disease is treated with a long course of antibiotics, sometimes administered intravenously over a period of months. Some people seem to develop chronic symptoms, especially painful arthritis and profound fatigue, that recur even after extended treatment.

Since its discovery in the 1970s, reported cases of Lyme disease have increased dramatically, from a few hundred cases to over 10,000 per year in the United States. The disease is found all over the world, on every continent except Antarctica, but is most common in Northern Europe, especially Germany and Scandinavia, and in North America. Cases of Lyme disease have been reported in 43 states, but most occur in the Northeast, in states along the Atlantic coast from Pennsylvania to Maine; in the upper Midwest, especially Wisconsin and Minnesota; and in the Pacific Northwest, from northern California to Washington. Seventy-seven percent of cases in the United States are reported in five states: New York, Connecticut, Pennsylvania, New Jersey, and Wisconsin. Lyme disease is now the most common bug-borne disease in the United States, and a number of hospitals and clinics have set up specialized facilities for research, diagnosis, and treatment. (See Figure 1, page vi.)

The difficulties of diagnosis, and the debilitating effects of advanced Lyme disease, have combined to make it a controversial, problematic illness. Anxiety surrounds the subject. Public health information, and scare stories in the press, have terrified many who live in the endemic areas. Those with long-term, debilitating disease have

to deal with the anxieties of a difficult diagnosis, shifting symptoms, and controversies over treatment. Paradoxically, Lyme disease is probably both over-diagnosed and under-diagnosed. Many patients become convinced they have it but don't, and others who do have it may be told they don't. Patients with Lyme disease have had their symptoms ascribed to everything from chronic fatigue syndrome (CFS) to Alzheimer's disease to psychiatric problems, and have gone for years without satisfactory treatment. At the same time, there are patients, and some doctors, who jump to a diagnosis of Lyme disease without carefully ruling out other illnesses with similar symptoms, and who proceed too quickly to costly, long-term antibiotic treatment that has its own considerable risks.

The fact is, medical knowledge about Lyme disease is still "under development." Doctors and researchers are making new discoveries each year in the areas of diagnosis, testing, treatment, and prevention. While there are clear-cut cases that can be easily diagnosed and treated, advanced Lyme disease can be difficult to diagnose and treat. In such cases, anyone who is looking at a possible diagnosis of Lyme disease should approach the subject in a calm, rational way. It's best to work with a doctor who has had some experience with the illness and can make a thorough, detailed evaluation, carefully considering both symptoms and medical history. This could be a medical specialist, perhaps a rheumatologist or infectious disease specialist, or even a general practitioner who may work in an endemic area and may have much experience with the disease. An experienced doctor should be able to distinguish Lyme disease from other diseases with similar symptoms, and to evaluate the possibility of a "mixed illness"—Lyme disease combined with other ailments.

In this booklet, we'll provide the essential information needed to understand how Lyme disease is currently diagnosed, treated, and—perhaps most important of all—prevented. First, let's look at a simple, clear-cut diagnosis and a successful treatment.

DIAGNOSIS AND CURE: THE HOLISTIC APPROACH

Joe was a high school junior who lived across the river from Manhattan in Queens, New York. He was an honors student, and a

dedicated athlete, working out regularly and building up his physique for the wrestling team. At sixteen, he had a terrific appetite, and was still growing, gaining weight and bulking up from his workouts. Joe and his family spent their summers in Montauk, out at the tip of Long Island, enjoying the seashore. One November, his parents called me, distraught. About halfway through the fall semester, Joe had begun to develop achy muscles and joints, and was feeling profoundly tired all the time, and psychologically pretty "down" as well. He'd lost his appetite, and was actually losing weight. By the time he came to me, he didn't look well, certainly not like the high-energy, athletic teenager his parents had described.

I thought about the sudden change in his health after his summer in Montauk, which is a known Lyme disease "hot spot," and about his achy joints. Both were a tip-off to possible Lyme disease, so I asked him if he'd noticed the characteristic rash, with the reddish circle and blanched interior. And sure enough, he remembered having several rashes like that after a canoe trip through the tidal marshes that summer. But they had gone away and he'd thought nothing more of it. I sent him to a reliable university hospital for the antibody blood test, and sure enough he had very high Lyme disease indicators. At this point, it was probably at least three months after his exposure, and maybe a month since his secondary symptoms had begun. I started him on antibiotic treatment with no further ado, and reassured his parents that he would do fine.

However, I did not rely solely on antibiotics in treating Joe. Antibiotics can "put out the fire," but they do not restore the body to health. In fact, antibiotics can present their own challenges to health, and in some cases an antibiotic "cure" can leave a patient in worse health than before treatment. With Lyme disease, as with many other kinds of illness, it's important to treat the whole body, and the whole patient. We can't just rely on a drug to restore someone to health, especially after a long and debilitating course of illness.

Since Lyme disease presents a severe challenge to the system, I talked to Joe about his diet and lifestyle, and also prescribed a protocol of vitamins and nutrients to support his recovery. Joe was already an active, athletic teenager, so I didn't have to worry too much about his desire to get back to his program of sports and exercise. But I did talk to him about diet. I took this opportunity to encourage a good natural diet, free of the sugar, caffeine, high-fat foods, and sometimes alcohol, that make up the typical teenager's diet. I encouraged a diet including lean protein, essential oils, whole grains, and lots of green leafy vegetables.

Antibiotic treatment can kill off some of the natural, beneficial bacteria that live in the digestive tract. In their absence, the yeast

organism called *Candida* can proliferate and take over, causing a whole range of symptoms, including fatigue, gas, bloating, diarrhea, and frequent vaginal infections in women. To keep Joe from developing a yeast infection, I prescribed several measures. First, I recommended a daily serving of unsweetened yogurt, with live acidophilus culture, or acidophilus capsules as a substitute. Acidophilus, one of the beneficial bacteria that naturally lives in the gut, can help in keeping yeast growth under control. Second, I warned Joe against the foods that can cause yeast growth, especially sugars and refined carbohydrates, including cookies, cakes, candy, ice cream, soda, and natural sweeteners including fructose, malt, barley and fruit juice. And I told him to steer clear of yeast-containing foods such as breads, baked goods, cheese, mushrooms, vinegar, soy sauce and fermented foods such as olives and pickles.

To help restore Joe to health, I also put him on a program of vitamin and nutrient supplements. As a kind of a helpful "jump start," I gave him an initial series of intravenous vitamin C treatments to enhance tissue repair. I then prescribed a multivitamin, with additional supplements of oral vitamin C and zinc. Vitamin C supplements can be of great benefit in fighting the effects of infections like Lyme disease.

I also recommended a zinc supplement, because zinc is immune-stimulating, and helps restore normal taste sensation and normal physical growth. Zinc is especially important for growing children and adolescents, and is helpful in restoring appetite. Actually, adolescent males have the highest zinc requirements, so this was a key nutrient for Joe, who'd been losing weight instead of gaining.

After three weeks of holistic and antibiotic treatment, Joe experienced an amazing improvement in his joint pain. His energy levels started to climb, the feelings of malaise disappeared, his appetite returned, and he began to gain weight again. I kept him on antibiotics for an additional three weeks as a precaution, to make sure the *Borrelia* spirochete was completely eradicated. And I made sure he maintained his healthy diet and kept up with the vitamins and nutrients. He came back three months later, looking much better, and by his six-month checkup he'd gained a total of twenty pounds, mostly in lean body mass, and looked like the active athlete he had been. At this point, I did order another blood test, and the antibody levels had gone way down. Though the antibody test is not an absolutely reliable indicator that Lyme disease is out of the system, his symptoms had clearly vanished, his health had returned, and he was obviously cured.

Joe's was a very straightforward case, both in diagnosis and treatment. Here we had a Lyme infection of relatively short duration,

in a young man with a robust immune system. Joe had a classical response to the infection, with the primary symptom of the target rash and the secondary symptom of achy joints. And he had a clear-cut response to antibiotic treatment and natural therapy. Several months had elapsed between his infection and the secondary symptoms, but the six-week course of antibiotics, along with the natural therapy, was effective in completely wiping out his symptoms, with no relapse thereafter.

I should point out that six weeks is a rather long course of antibiotics, and I would not recommend it for most infections. I am very concerned about the overuse of antibiotics, and the risks of inducing secondary infections like yeast infection and engendering microbes with multiple resistance to antibiotics. However, the seven-to-ten-day course that is prescribed for most types of infections is just not enough to wipe out the Lyme spirochete and prevent relapses. This is because the Lyme spirochete takes up residence deep in tissue, in cerebrospinal fluid, and even within cells, in places where it's hard for antibiotics to reach. So we have to bend our normal practice here. And this is all the more reason why we have to support recovery in a holistic way, using diet and nutrients to prevent the side effects of antibiotic treatment as they restore the whole body to health.

HOW LYME DISEASE IS TRANSMITTED: TICKS AND OTHER CARRIERS

The tick first identified as the transmitter of Lyme disease in the Northeast, *Ixodes dammini*, is known as the "deer tick" because in its adult stage it lives and mates on the white-tailed deer. However, "deer tick" may be something of a misnomer, since the tick lives and feeds on many other animals—including wild animals like field mice, opossums and raccoons, and domestic animals and pets like dogs, horses, and cattle. In fact, it's been found on at least 30 different species of mammals, 49 species of birds, and several reptiles. In earlier stages of their life cycle, the ticks hitch a ride on the smaller animals, especially field mice, and then fall off onto grasses and

brush, and wait to catch their next ride (and meal) on larger animals like dogs, deer, and people. Lyme disease has been spreading steadily over recent years in a southerly direction, and it's thought that the tick is hitching a ride on migratory birds.

In different parts of the country, different ticks carry the disease. In the Northeast and Midwest, the deer tick, *Ixodes dammini,* is the culprit. It ranges from Maine to Florida, and west of the Mississippi. In the South, it's the black-legged tick, *Ixodes scapularis.* (Recent taxonomic research has indicated that these two ticks probably belong to a single species, despite the two names.) In the West, its the *western* black-legged tick, *Ixodes pacificus,* that carries the disease in Nevada, Utah, and the Pacific coast from Northern California to Washington. The western black-legged tick feeds not on deer, but on jackrabbits and lizards. The lone star tick, *Amblyomma americanum,* which also carries Rocky Mountain spotted fever, now carries Lyme disease as well, and ranges through the West and southern Midwest. There is increasing concern that the American dog tick, *Dermacentor variabilis,* may be able to transmit the disease.

Let's take a closer look at the life cycle of one of these, the deer tick, to see how Lyme disease is spread. The tick hatches in the spring, and passes through three stages during its two-year life. In the first, or larval, stage, the immature tick is extremely tiny. It normally attaches itself to the white-footed mouse, its principal host at this stage, and will eat one meal of blood. At this time, it may first pick up the Lyme bacterium from an infected mouse. The tick then molts into the nymph stage, which is about the size of a poppy seed or a pinhead. An infected larva will molt into an infected nymph. The nymphs attach themselves to larger animals, such as dogs, opossums, deer . . . or people. They will eat another blood meal, and may inject some of their own body fluids into the host during the process, thus passing on the Lyme spirochete. The nymph will enlarge in size during its meal, growing as large as a small freckle or mole. After its meal, the tick will drop off into tall grass or bushes, and await its third host, which is usually a deer.

The adult tick is a little larger than the nymph. (See Figure 2, page vi.) It is flat, and about the size of a sesame seed—less than one-tenth of an inch in length—though it becomes larger when engorged with blood. This is the first stage that it is large enough to look like what most people think of as a tick. The adults have eight legs, like a spider, and the male is black, the female dark red and black. When engorged with blood, they turn gray, and may enlarge three to five times in size. The adult tick will eat one last blood meal on a deer, mate, and drop off to lay its eggs. The deer themselves do not always

seem to become infected with the Lyme spirochete, but they are an essential host in the tick's life cycle.

The nymphs and the adults are the most likely to infect humans. The nymphs are the biggest threat, because they are hardest to see, and the bites are painless. In fact, it is estimated that 70 to 90 percent of all cases of Lyme disease are caused by nymph bites. The nymphs and adults wait on low vegetation in wooded areas, in neighboring grasslands, or in tall sea grasses by the ocean. They can't fly or jump, but will hitch a ride on whatever warm-blooded animal brushes by. Dogs and other pets can carry the ticks to homes and yards (though it seems that cats are less likely to carry the tick, perhaps because of their constant grooming).

Not all deer ticks actually carry the bacteria that cause Lyme disease, and only an infected tick can transmit Lyme disease. The percentage of infected ticks may vary from only 2 percent in some areas to more than 90 percent in Lyme disease "hot spots." Even an infected tick may not transmit Lyme disease if it is discovered and removed in time. An infected tick must usually feed for 24 to 48 hours before passing the spirochete into the bloodstream of its host, and transmitting the infection.

HOT SPOTS, DANGER ZONES, AND LYME SEASON

Though deer do not actually carry Lyme disease, they do carry the ticks that carry the disease, and the expanding deer population throughout certain regions of the U.S. is a major cause of the spread of Lyme disease. In addition, fewer people are hunting deer for sport, and their natural predators have been disappearing. So deer are not only growing in numbers, but moving into new areas closer to population centers. At the same time, people are moving much closer to deer as suburbs expand into abandoned farmland and houses are scattered through wooded areas.

The real hot spots for Lyme disease are places where suburban lawns meet woodlands, such as Westchester County, just north of New York City, and throughout New Jersey where expanding cities butt up against farmland and woods. The tick population has been exploding along with the deer population; hence the increased rates

of infection. In 1982, deer ticks were rare in Westchester County, New York; they now average 1½ ticks per square yard in some study plots. Some of the small East coast islands are also among the hottest spots for Lyme disease. These include popular summer tourist destinations, like Nantucket, Block Island, Fire Island, and even the Florida Keys, where exploding deer populations simply have nowhere to go. There is a high risk of Lyme disease for people who inhabit or visit these areas.

In whatever part of the country, Lyme hot spots are determined by four factors: the number of cases reported; the size of the deer population; the degree of tick infestation; and the percentage of infected ticks. Many state health departments are now keeping epidemiological records on the Lyme risk areas, and can tell you what percentage of ticks are infected in a given locality. Hospitals with Lyme disease clinics may also be able to inform you about local risk areas.

The danger zones are woods, tall grass and brush, marshy areas with tall reeds and grasses, and seashore grassland, but ticks can lurk even in mowed lawns. People who work or pursue hobbies outdoors in the danger zones are at special risk. These include farmers, landscapers, tree surgeons, park rangers, hunters, and hikers. City folk and tourists are at risk as well, from weekend excursions into the country, or serious hiking and camping trips in woods and state parks. Entire families have been infected with Lyme disease, picked up on canoeing or hiking trips.

In the Northwest and Midwest, the months from May through August pose the greatest risk for contracting Lyme disease. This is when the nymphs are active, and most people are out of doors. The rates of infection are somewhat lower on either side of Lyme "season," which includes the months of April, and September through November. The rate is lowest from December through March, but there still is some risk. It is perfectly possible to catch Lyme disease on warm winter days, especially in the endemic areas. People who are out in woods or brush in fall and winter months must still take precautions.

In California, the high-risk season is November to April, and risk seasons may vary in other parts of the country.

PREVENTING LYME DISEASE

By far the best way to deal with Lyme disease at this time is to avoid becoming infected. A Lyme vaccine is currently under study, but at the time of this writing has not yet been proven safe and effective. We do not have an effective means of preventing the spread of the spirochete in the wild, though some local measures have shown promise. Pets and domestic animals are susceptible to Lyme disease, and can increase the risk for humans. Fortunately, there is a vaccine for dogs, but we have to include pets when taking preventive measures. To prevent Lyme disease, we have to begin by guarding against tick bites, and by careful inspection and removal of any ticks that we do pick up.

How to Avoid Tick Bites

First of all, be aware of the high-risk environments for Lyme disease, and the endemic areas and hot spots that you may reside in or travel to. In Lyme disease areas, the high-risk environments include woods and brush, tall grass, marshes, hiking trails, grassy dunes, and the like. The Lyme spirochete loves the seashore just as much as the deep woods. Suburban areas where housing abuts woods or farmland, or anywhere you can see deer, are high-risk areas for Lyme. In state parks or forests, be aware of Lyme warnings. And in Lyme areas, follow these precautions when hiking in the woods, gardening, doing yard work, or walking in tall grass:

- Wear protective clothing. Wear long pants, long-sleeved shirts with button sleeves. Tuck shirts into pants, pants legs into socks, wear closed shoes. Wear light-colored, tightly-woven materials; it's easier to spot ticks on white or tan cloth, and they may not be able to grip to slippery, tight weaves like nylon. In the woods, wear a close-fitting hat or cap; ticks like to get into hair, behind ears.