Education Key to Preventing Lyme Disease

BY JANET MAYER

Although unknown just 25 years ago, Lyme disease (LD) is now familiar to just about everyone. Most people know the disease originates from a tick bite, and they may even take some preventive measures to protect themselves when working or playing outdoors. But knowledge of the disease beyond these points often is sketchy.

Thought by many in the health field to be one of the fastest-growing epidemics of the 20th century, second only to AIDS, Lyme disease is certainly becoming a national concern. However, since the disease is preventable and is easily treatable when detected in its early stages, the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) caution that the best prevention for Lyme disease is education. Knowing where the disease originates and what measures to take for prevention are the best weapons for anyone who spends much time outdoors.

How many cases of Lyme disease are there?

Although the risk of developing Lyme disease from a tick bite is small even in areas of heavy tick infestation, the number of Lyme disease cases reported in the United States has been increasing rapidly. The Lyme Disease Foundation, based in Hartford, Conn., reports that 112,000 cases were reported in 49 states from 1980 to 1998, with Montana being the only state without any reported cases. Another study estimates there may be closer to 1.5-2 million cases of Lyme disease in this country.

In 1993 the New York University Stern School of Business estimated that Lyme disease costs society about $1 billion/year. This included cost of inappropriate or unnecessary medical treatment, legal fees, lost productivity, and other direct or indirect expenses but didn't include the human toll.

Patients can have ongoing problems resulting in permanent physical damage, emotional distress and significant disruption of life, which can relate to loss of employment, loss of family and friends, and sometimes divorce.

A 37-year-old professional, who lives in Oregon and contracted the disease some five years ago, calculates he has lost countless hours from his work and about $20,000 in salary. Still, he says, the damage to his career and the loss of quality of life to both himself and his family cannot be estimated in dollars. During his illness, he also has lost trust and faith in a medical profession that he feels refused to acknowledge and treat the disease as the growing health threat it has become.

Where did Lyme disease originate?

In 1975 a group of more than 50 people, many of them children, developed a mysterious disease that resulted in inflammatory arthritis in Old Lyme, Conn. A tick was found to be the causative agent and the mode of transmission. The disease was named after the town. The disease had previously been reported in 1970 in Wisconsin and in Europe in the early 1900s, but the causative agent was not identified until after the outbreak in Connecticut.

CDC initiated surveillance for the disease in 1982, and the Council of States and Territorial Epidemiologists designated it a nationally notifiable disease in 1991. By 1996, 45 states and the District of Columbia reported 16,461 cases of Lyme disease, with Alaska, Arizona, Colorado, Montana and South Dakota the only exceptions with zero cases.

CDC reports most cases are concentrated in the Northeastern and mid-Atlantic states, Minnesota, Wisconsin, California and Oregon.

How is Lyme disease transmitted?

Lyme disease is caused by a multisystem infection caused by the spirochete (a slender, spiral bacteria) *Borrelia burgdoferi* and transmitted by a tick, including the Western black-legged tick (*Ixodes pacificus*) in the West, and the black-legged tick (*I. scapularis*), which was once known as the "deer" tick, in much of the country. Both species are miniscule, being about the size of a poppy seed or a pinhead.

Research is underway to determine if the lone star tick (*Amblyomma americanum*) may also transmit the infection.

According to the information distributed by the Lyme Disease Foundation, ticks go through four life stages: egg, larva, nymph and adult. They evolve from one life stage to another by molting.

Each of the last three stages requires a blood meal. If the tick feeds on an infected host animal, the tick becomes infected. Ticks that transmit Lyme disease can retain the infection throughout their lives and are able to transmit the infection to subsequent hosts, although the adult ticks do not generally pass the spirochete on to the next generation.

In the larval stage, small mammals are generally the host, but humans and birds can also serve as hosts. Most humans contract the disease when they become the host of a nymph.

Adult ticks are found in brush vegetation about 3 feet off the ground. They attach to any warm-blooded animal (host) that may brush against them. The female ticks feed on the host, lay eggs, and the cycle begins anew.

Health officials advise that it takes at least 24-48 hours for a tick to transmit the Lyme-disease infection, so early detection and prompt, proper removal of potentially infected ticks are important.

What are the symptoms of the disease?

Symptoms of Lyme disease in humans can vary, but the first sign usually appears as a small, red (often "bulls-eye" shaped) rash within a day of the bite or as late as a month later. More noticeable on light-skinned patients, the rash may start as a small, reddish bump about ½ inch in diameter. It soon expands outward, often leaving a clearing in the center. On dark-skinned people, the rash can resemble a bruise.

The disease soon can progress to flu-like symptoms — chills, stiff neck, muscle aches, fatigue and swollen lymph nodes. If left untreated, the disease can lead to more severe symptoms months or years later, including nervous-system abnormalities, heart-rhythm irregularities and severe arthritis.

According to Pennsylvania State University's College of Agricultural Sciences, domestic animals are also at risk of contracting Lyme disease. Cats and dogs usually display symptoms that can include fever, anorexia, lethargy, depression and sudden onset of arthritis, primarily in large joints.

In horses, clinical signs of Lyme disease can include lameness or stiff joints, laminitis (founder), depression, loss of appetite, and moon blindness or loss of vision. Spontaneous abortion and encephalitis can occur, and colts born to infected mares have displayed birth defects.

Although many cattle do not display signs of Lyme disease, those that do may have lameness, painful or swollen joints, fever, laminitis, or weight loss. A skin rash may be present on the udder.

The disease can be transmitted directly from cow to cow through infected urine, and pregnant cows may pass the bacteria directly to their unborn calves. The Lyme bacterium can be found in blood, milk, synovial fluid and spontaneously aborted fetal tissue. It can survive in frozen milk but is killed through pasteurization.

How is Lyme disease diagnosed?

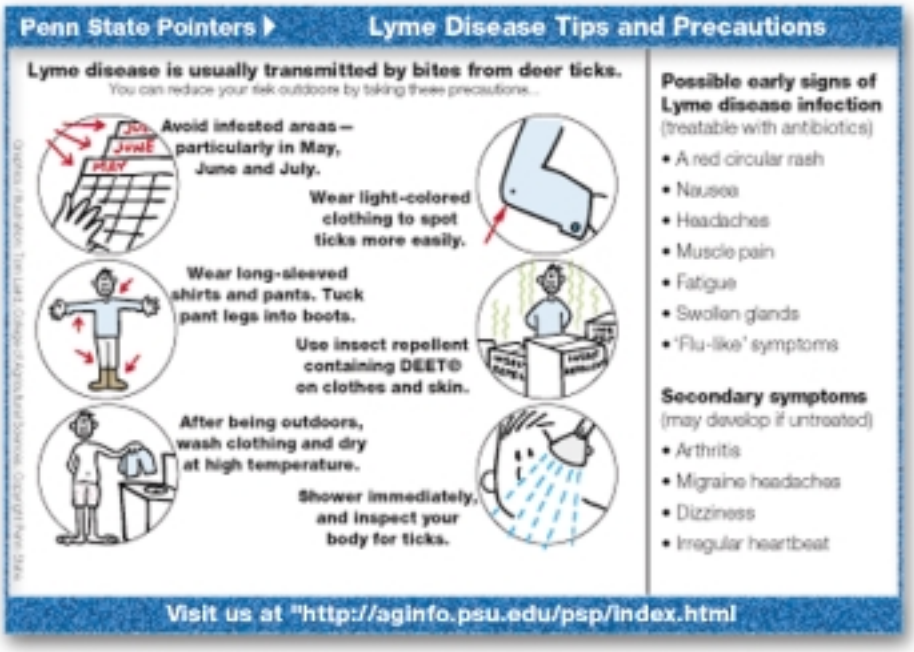
Lyme disease is often difficult to diagnose in humans, as there is not a simple test that can determine if a patient is infected, then demonstrate that the patient has become bacterium-free. Blood tests to detect increased levels of antibodies of the spirochete bacteria are available in the later stages of Lyme disease; however, in the early stages false negatives occur about 60% of the time.

Most clinical diagnosis is based on signs and symptoms with the history of the patient's exposure to infested areas and test results being additional pieces of information in the complete picture.

Prior to last year, there was no test that could completely "rule out" Lyme disease. But in February 1999 the Food and Drug Administration (FDA) cleared a new blood test to be performed in doctors' offices that may alleviate that problem.

How is Lyme disease treated?

Health officials report that because Lyme disease is caused by bacteria, it is treatable with antibiotics in all its stages. Treatment varies and depends on how early diagnosis is made and the organ systems involved. Patients treated in the early stages of the disease usually respond well to oral antibiotics, and even those treated in much later stages with oral or intravenous antibiotics usually recover satisfactorily, although some may have recurring symptoms or permanent joint damage.



Can Lyme disease be prevented?

Because Lyme disease is difficult to diagnose and sometimes does not respond to treatment, researchers have spent many years trying to create a vaccine to protect people from the disorder. In December 1998 the FDA approved a vaccine to prevent Lyme disease even though they emphasize the vaccine is not 100% effective.

Since the vaccine has proven to be a step in the right direction, health officials advise people who live, work or vacation in high-risk areas to consider being vaccinated with the recommended three doses in a 12-month period.

The Lyme Disease Foundation advises that ticks can be anywhere — from your own backyard to the woods and even by the seashore. While ticks can bite year-round, peak tick season in the Northeast is April through September and November through April on the West Coast.

Ticks can survive under a variety of conditions as long as adequate moisture is available.

Government publications warn people entering tick-infested areas to walk in the center of trails to avoid picking up ticks from overhanging grass and brush. To minimize skin exposure, long pants and long-sleeved shirts that fit snugly at the ankles and wrists should be worn. As further safeguards, wear a hat, tuck pant legs into socks and wear shoes that completely cover the feet. Light-colored clothing makes tick detection easier.

To repel ticks, spray clothing with the insecticide permethrin, commonly found in lawn-and-garden stores, or use insect repellents that contain a chemical called DEET®, which also can be applied to clothing or directly onto the skin.

Although highly effective, these repellents can cause some serious side effects if used repeatedly. Infants and children may be at risk for adverse reactions to DEET.

For animals, apply tick-killing chemicals like permethrin and pyrethrins in the form of sprays, dips or pour-ons.

After being outdoors, check yourself and family members for ticks, and don't forget pets. Remove clothing to inspect your entire body thoroughly. Remove any attached ticks carefully and make sure to wash and dry your clothing.

How do you properly remove a tick?

Health workers advise removing attached ticks properly and promptly by grasping the tick gently, but firmly, with blunt tweezers near the head (the place where the tick is attached) and gently pulling upwards until the tick detaches. Do not use your bare fingers or crush the tick's body. Swab the bite area thoroughly with an antiseptic to prevent bacterial infection, and disinfect the tweezers. Remember to wash your hands thoroughly. AJ

For more information on Lyme disease, see the Lyme Disease Foundation's Web site at www.lyme.org *or visit Pennsylvania State University's Web site* at www.psu.edu.