

3. THE GLOBAL PERSPECTIVE

LYME DISEASE IS ALSO A GLOBAL PROBLEM—IT KNOWS NO international borders, nor borders of race, color, politics, religion or socio-economic status. As people travel and birds and insects migrate, the bacteria are carried far and wide. Strains of *Borrelia*, the bacteria that causes Lyme disease, have been found in supposedly unaffected areas, and similarly the co-infections of Lyme (again, more on those later) are far-reaching also. And while Lyme disease is recognized in one state or province, a neighboring state or province might authoritatively state, “We don’t have Lyme disease here!” Such logic is fallacious and contrary to the way in which Lyme disease moves and spreads across geographic regions.

Global deforestation has broken down the delineation between humans and tick-dense areas. Human expansion has also resulted in the reduction of predators that hunt deer as well as mice, chipmunks and other small rodents—the primary reservoirs for Lyme disease. Researchers are also investigating the role of global warming in the spread of vector-borne diseases such as Lyme disease.

Following is a summary of some of the nations affected by Lyme disease. (Excerpted from Bryan Rosner's *Lyme Disease Annual Report*¹):

England

The British public has been warned by the Health Protection Agency (HPA) to carefully protect themselves from tick bites due to a “sharp

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rise in the number of the blood-sucking parasites and increased cases of Lyme disease in Hampshire, Dorset, and Berkshire.” The increase in tick population has been blamed on a “particularly wet and mild summer.” According to the HPA, “Lyme disease is a highly infectious disease which is transmitted through tick bites and can lead to blindness, paralysis, and even death if left undiagnosed.” Britons are advised to protect themselves by “wearing trousers, using insect repellent and checking their skin for ticks” after visits to the countryside. The HPA also notes that “incidents of Lyme disease have increased by 90% since 2006 across the UK, and New Forest, South Downs, Dorset, and Berkshire have now been named as tick hot-spots.”

Sweden and Norway

The Department of Molecular Biology at Umeå University, Umeå, Sweden, released a study in 2007 that stated: “The reported geographical distribution of Lyme disease is constantly increasing in Sweden.” The report cites findings, which show that birds play a key role in the spread of Lyme disease due to their long distance dispersal and their role as reservoir hosts for *Borrelia*. In addition to Lyme disease in Sweden, Swedish researchers also discovered that sea birds in the Arctic region of Norway carry *Ixodes uria* ticks infected with Lyme disease, specifically the *Borrelia garinii* strain. It has long been known that *Borrelia garinii* is one of the more common forms of Lyme disease on the European continent, and this information shows the spread of this strain to new geographical areas.

Russia

In collaboration with U.S. Centers for Disease Control (CDC) researchers, Russian scientists set out to determine which types of bacterial agents are found in the North Western region of Russia. The type of tick examined was *Ixodes persulcatus*. Researchers discovered the following:

Altogether, 27.7% of ticks were infected with at least one organism, while the DNA of two or more bacteria was found in 11.8% of ticks tested. The highest average prevalence of *Anaplasma* (20.8%) was detected in ticks from Arkhangel'sk province, while the prevalence in ticks from Novgorod province and St. Petersburg, respectively, was 7.3% and 12.2%. Only

Ehrlichia muris DNA was identified by DNA sequencing. In comparison, the prevalence of *B. burgdorferi* DNA was 16.6%, 5.8%, and 24.5% in the respective locations.

The Russian researchers conclude with this statement: "Since *Ixodes persulcatus* is so commonly infected with multiple agents that may cause human diseases, exposure to these ticks poses significant risk to human health in this region."

Germany

Researchers in Germany studied the influence of preventative measures on the risk of being bitten by a tick and suffering from Lyme disease in children attending kindergarten in forested regions of Germany. Fifty-three schools were studied, encompassing 1,707 children. Researchers concluded that "children in forest kindergartens are at a considerable risk of tick bites and Lyme disease."

Poland

Department of Occupational Biohazards investigated the prevalence of Lyme disease bacteria in ticks collected from wooded areas. 1,813 ticks from six districts were examined by polymerase chain reaction (PCR). Not only did researchers discover that a significant portion of the ticks were infected, they also were surprised to find that many ticks were infected with multiple strains of Lyme disease bacteria, including *Borrelia afzelii*, *Borrelia garinii*, and a new yet-unnamed strain, "*Borrelia b.s.1.*"

Portugal

A Portuguese University, in a study of climate change, discovered that warmer and increasingly variable weather may result in an increased incidence of vector-borne diseases, including malaria, schistosomiasis, leishmaniasis, Lyme disease, and Mediterranean spotted fever.

Scotland

A fascinating report from the microbiology department at Raigmore Hospital in Scotland states that at least nine different strains of *Borrelia* have

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been documented in Scotland, including *Borrelia afzelii* and *Borrelia sensu stricto*. Additionally, a report appeared on September 15, 2007, in the *North Scotland Press and Journal*, entitled "Bloodsucking Ticks Blamed as Lethal Lyme Disease Cases Soar." This newspaper article not only documents the dramatic increase of Lyme disease cases in Scotland, it also provides evidence that Lyme disease can be fatal if not treated adequately. The article uses the word "rocketed" to describe the dramatic increase in cases over the past decade. Dr. Ken Oates of Health Protection Scotland observes that "There has been a genuine rise. Nobody can really say why. I would guess a summer like this, which is warm and wet, provides favorable conditions. Up to one in five ticks can carry Lyme disease in Scotland."

Croatia

As far away as Croatia, researchers are finding Lyme disease. Amazingly, 3,317 cases were reported from 1987 to 2003 in Croatia. North-western Croatia showed the highest incidence. According to a report published by the Department of Public Health, "the clinical picture of Lyme Borreliosis in Croatia is dominated by erythema migrans, followed by neurological manifestations."

Switzerland

In Switzerland, according to researchers, "the incidence of tick-borne encephalitis has been clearly increasing since 2004, and this is caused mostly by Lyme disease."

Canada

The Canadian Centre for Disease Control states "the black-legged tick, *Ixodes scapularis*, has a wide geographical distribution in Ontario, Canada, with a detected range extending at least as far north as the 50th parallel, and four out of five regions of Ontario affected." Additionally, "The Lyme disease spirochete was detected in 12.9% of *I. scapularis* adult ticks." Also according to Canadian authorities, "characterization of *B. burgdorferi* in Canada displays a connecting link to common strains of Lyme disease found in the north-eastern United States." According to the Vector-Borne

Disease Laboratory in British Columbia, "In 1994, British Columbia was declared an endemic region for Lyme Borreliosis." In Alberta, Lyme disease has been found to be common in rabbit ticks. The Department of Medicine at McGill University, Montreal, notes in a recent report that "Lyme disease is an expanding community health issue."

The poor recognition of Lyme disease by the medical establishment is not a phenomena limited to the United States: On September 17, 2007, CBS News Canada reported the story of approximately 100 Lyme disease sufferers who gathered on Parliament Hill in Canada to get the attention of Canadian physicians. The aim of the gathering was to get better testing for the disease and more federal money devoted to research—many in the group say they were misdiagnosed by their physicians. Amazingly, according to the CBS report, "Lyme disease is not a nationally reportable disease in Canada, according to the Public Health Agency of Canada (PHAC), meaning there are no statistics available on its prevalence." Yet, although not reportable, CBS goes on to state that "*Borrelia burgdorferi* is predominantly found in parts of British Columbia, southern and eastern Ontario, south-eastern Manitoba, and parts of Nova Scotia."

Try to figure out that contradiction: not reportable yet found practically everywhere. The CBS article concludes with the story of a Canadian professor who, after suspecting Lyme disease, was forced to travel to the United States and pay more than \$15,000 out-of-pocket for treatment. Now, with unrelenting persecution of Lyme doctors in the United States, appropriate Lyme disease treatment may be harder and harder to find... anywhere in the world. The research identifying Lyme disease in Canada goes on and on, with over 83 official, published studies on Lyme disease in Canada. The Canadian Lyme Disease Association can be visited at www.canlyme.org.

Africa

A report published in Africa notes that "Lyme disease is now the most common vector-borne disease in Europe and North America, but there is also evidence that the disease is in Africa as well." Researchers found various strains of *Borrelia* in ticks located in Tunisia and Morocco,

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including the strains *B. garinii*, *B. burgdorferi* ss, and *B. lusitaniae*. More than 40 published studies have been released chronicling Lyme disease in Africa. On September 24, 2007, *Afriqu' Echos Magazine*, one of the larger news magazines in Africa, reported on a team of researchers who, from 1990 to 2003, studied the disease in Dielmo, a Senegalese village. They found that over 11% of Africans in the village had suffered from Borreliosis at one point in their lives. The same article in *Afriqu' Echos Magazine* also quotes the French Institute of Research and Development (the IRD): "Lyme disease is the most frequent bacterial disease in Africa, but it is also an affliction that is completely unknown to health professionals." The IRD evaluated a rural African area of Dakar and found that "Lyme Borreliosis was the most frequent reason for dispensary consultations after malaria." The article in *Afriqu' Echos Magazine* further states that:

"Researchers also discovered that this disease caused recurrent fever in the long term which could result in serious meningoencephalitis, which was sometimes fatal—symptoms exactly similar to those of malaria. The disease is thus systematically confused with malaria, which explains, of course, why there has been so much failure in terms of treatment since treatment for malaria is not effective against Borreliosis. Only tetracycline antibiotics produce results. Diagnosis is also made difficult by the problem of detecting *Borrelia crocidurae* [note this new strain of Lyme disease], the bacteria responsible for the disease. It is not detectable in the blood except during attacks of fever, and laboratory examinations are rarely possible in tropical Africa, in particular in rural areas."

Imagine the complexity now in Africa of untangling the diagnosis and treatment of two diseases, Lyme disease and malaria, which have similar symptoms and are presently ravaging Africa, but which health care practitioners are not trained to differentiate.

South America

South America is not immune either. Chile, Brazil, Argentina, Costa Rica,

and other countries have reported isolated, although increasing, incidences of the Lyme disease infection. Numerous studies document Lyme disease in South America.

Australia

Case reports of Lyme disease in Australia date back to the early 1980s. Three of them are reported in case reports and letters to the editor in the *Medical Journal of Australia*. All three meet the diagnostic criteria for Lyme disease. Despite resistance to acknowledge Lyme disease as an emerging disease in Australia, there is increasing evidence of it there. According to the Lyme Disease Association of Australia, at the time of writing there are at least 15,000 diagnosed cases of Lyme disease in Australia, with conservative estimates of another 200,000 people undiagnosed.

A recent study of 51 subjects looked at both Borreliosis and co-infections of Lyme disease in Australian patients.² Most patients reported symptom onset in Australia without recent overseas travel. 28 of 51 (55%) tested positive for Lyme disease. Of 41 patients tested for tick-borne co-infections, 13 (32%) were positive for *Babesia* species and nine (22%) were positive for *Bartonella* species. Twenty-five patients tested positive for *Ehrlichia* species and (16%) were positive for *Anaplasma phagocytophilum* while none were positive for *Ehrlichia chaffeensis*. Among the 51 patients tested for Lyme disease, 21 (41%) had evidence of more than one tick-borne infection. Positive tests for *Borrelia*, *Babesia duncani*, *Babesia microti*, and *Bartonella henselae* were demonstrated in an individual who had never left the state of Queensland. Positive testing for these pathogens was found in three others whose movements were restricted to the east coast of Australia. Interestingly, four subjects from this study had not left Australia, and still had positive lab results for Lyme disease and *Babesia*.

Researchers at the University of Sydney are looking into the diagnostic aspects of Lyme disease in Australia—comparing the results of testing for *Borrelia* done in Australia, with results of tests run through IGeneX, a specialty Lyme lab. The goal of the research is to assess whether results

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are comparable from both, and whether the Australian testing is sensitive enough to detect *Borrelia*; as well as to evaluate whether the U.S. CDC surveillance criteria are appropriate in Australia.³

Results so far show that of 148 Australian patients, 70% returned a positive IgG or IgM Western Blot through IGeneX lab in the United States. Further 53% returned confirmation of exposure of up to 3 other tick-borne pathogens (e.g. *Rickettsia* species, *Babesia* species, *Bartonella* species). Put simply, when tested through a specialized lab, with more sensitive diagnostic procedures, 70% of Australian patients showed a positive result while 53% of that group tested positive for co-infections.



The above information only scratches the surface. Many more pages would be needed to report all the available studies and articles. It is no great surprise that Lyme disease is emerging as a global epidemic. Geographical borders are simply imaginary lines used to differentiate political systems, allocation of land, leadership organizations, financial infrastructures and other man-made tenets. While some boundaries are physical, in the case of rivers or oceans, there is still migration of birds and animals across borders. Indeed, in many cases borders between countries hold no ecological significance, and thus do not contain microbes or disease processes. So it is with the spread of Lyme disease throughout America and to many nations of the world.

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