LEPTOSPIRAL INFECTIONS
LYME DISEASE
BABESIOSIS
ORF VIRUS DISEASE

Report to the
Minister for Health
and the Minister for Agriculture and Food
on certain Zoonotic Diseases

REPORT NO. II
June 1992
The Food Safety Advisory Committee was established by the Minister for Health and the Minister of Agriculture and Food in July, 1989.

Terms of Reference

1. To advise the Minister for Health and the Minister for Agriculture and Food on matters relating to food and zoonotic diseases referred to it and to make recommendations to the Ministers.

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Since *Leptospira icterohaemorrhagiae* was first demonstrated as the cause of Weil's Disease in Japan in 1914, over 130 serotypes have been identified and Leptospirosis in man or animals has been caused by most of them. The spread of infection in each case is along a similar path. An animal, frequently a rat or other rodent serves as the host, often suffering little from the infection, but shedding *Leptospira* in his urine for a long time. In stagnant water or wet soil contaminated by urine, the *Leptospira* survive for long periods (sometimes months) and if during this period they come in contact with human skin, or mucous membranes of the eyes or nasopharynx, they may invade the blood stream and cause infection.

The genus *Leptospira* comprises two species, *Leptospira biflexa*, which includes saprophytic serotypes and *Leptospira interrogans*, which contains 202 pathogenic serovars in 23 serogroups. In Britain and Ireland pathogenic leptospires from 10 serogroups have been isolated from wild and domestic animals. While *Leptospira* survive in moist conditions outside the host for many days to weeks, they are easily destroyed by drying, exposure to disinfectants and detergents, or heating to 50°C for five minutes. Survival in salt water is only for a few hours. Leptospirosis presents in various ways. About 90% of symptomatic patients present with a mild influenza-like illness which usually resolves uneventfully in two to three weeks. A small proportion develop haemorrhagic complications with severe kidney and liver failure and 10-20% of these patients may die. Occasionally patients present with meningitis.
Traditionally leptospirosis was associated with sewer workers, miners, and fish workers, but farmers and agricultural and abattoir workers are now the main occupational group at risk, accounting for over 50% of cases. People in contact with rats or natural inland waters are potentially at risk. Of the 299 confirmed cases in England and Wales during 1985-1989, leptospirosis due to *L. hardjo* from cattle accounted for 157 cases, *L. icterohaemorrhagiae* for 87, undetermined serovars for 45, and other serovars for 10. During the same period the Leptospira Reference Laboratory confirmed 44 cases from Scotland and 42 cases from Ireland. Of the forty two (42) confirmed cases, leptospirosis due to *L. icterohaemorrhagiae* accounted for 20 cases, *L. hardjo* for 15 cases and the remainder were undetermined. Total prevention of leptospirosis is impossible. Large scale vaccination of domestic animals can prevent animal disease and decrease the frequency of renal excretion of leptospires. There is now good serological evidence that *Leptospira hardjo* commonly infects Irish cattle. For example, during the six month period (November 1990 – April 1991), 5,474 bovine serum samples were tested for *Leptospira hardjo* specific antibodies. Evidence of infection was detected in 49% of cattle and 26.6% of these animals had high titres which may have been indicative of recent infection. Vaccination is now widely used in the control of leptospirosis in cattle and in dogs. Human vaccines have been used overseas in high risk groups with varied success. No human vaccine is available in Britain or Ireland.
RECOMMENDATIONS FOR REDUCING THE RISK OF LEPTOSPIROPSIS

Recommendations include:

- Improved surveillance of the disease.
- Reduction of the rat population.
- Non-handling of rat carcases with unprotected hands.
- Covering all cuts with waterproof plasters.
- The wearing of protective clothing, including footwear.

Rivers, lakes and canals may be contaminated with leptospires shed by animals e.g. rats, cattle or dogs. Consequently showering after canoeing, windsurfing, water-skiing, swimming, paddling or accidental immersion in waterways would help to reduce risks from this source.

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1. Ferguson Ian R.
   B.J.M. 302, 128-129.

   (Personal Communication)
WHAT IS LYME DISEASE?

Lyme disease was described as a separate entity in 1977 because of a geographical clustering of children in Lyme, Connecticut, who were thought to have juvenile rheumatoid arthritis. The rural setting of the case clusters and the association of a particular type of rash (erythema migrans) as a feature of the illness suggested that the disorder was transmitted by an arthropod. Lyme disease is a multi system illness and affects primarily the skin, nervous system, heart and joints. In 1982, Burgdorfer and Barber isolated the spirochete responsible, now called *Borrelia burgdorferi* from a species of tick, *Ixodes dammini*. Other species of tick may also be involved, e.g. *Ixodes ricinus* in Europe. In dogs, fever, anorexia and arthritis are the most commonly observed signs. There are isolated reports of the disease in the horse and of antibody titres to *Borrelia* in cows and cats.

HOW IS LYME DISEASE TRANSMITTED?

The microbe that causes Lyme Disease is acquired by juvenile ticks (larvae) through feeding on an infected animal, usually a mouse. At a subsequent stage in development (nymph), the ticks cling to vegetation in brushy, wooded or grassy areas and transfer by direct contact to the skin of passing animals or humans. The bite of the infected tick can then transmit the spirochete to the new host. This transmission of the infectious organism appears to require that the tick be attached for at least 24 hours. The tick is very small and during its complex 2 year life cycle, it can affect a variety of hosts including mice, deer and possibly other animals as
well as humans. It is important to note that not all ticks carry Lyme disease, and even a bite from an infected tick does not necessarily mean that the disease will follow. Prompt removal of a tick will lessen chances of disease transmission.

Borellia burgdorferi have been isolated from blood, urine, synovial fluid and colostrum of infected cows. It has been demonstrated that rats and dogs can be infected through consumption of infected organs. Guinea pigs that consumed milk from an infected female became infected themselves.¹ In view of these findings the possibility of Lyme disease occurring as a food or milk borne infection should be considered.

WHAT ARE THE SIGNS OF LYME DISEASE?

Early: The first sign of Lyme Disease is usually a skin rash. While the tick may go undetected, the rash occurs at the site of the bite. It begins as a small red area, three to 32 days after the bite, then gradually enlarges, often with partial clearing in the centre so that it resembles a doughnut. These skin changes may be accompanied by flu-like illness, such as fever, headache, stiff neck, sore and aching muscles and joints, fatigue, sore throat, and swollen glands.

Late: Three major organ systems — the joints, nervous system, and heart — can be affected even weeks to months after the initial tick bite. Symptoms usually appear within four to six weeks. Because of potential permanent disability, early detection is important.
EPIDEMIOLOGY

While the disease is common in certain states of the United States it is now known to have a world-wide distribution. It is postulated that the spread of Lyme disease in the United States is related to the reverting of farmland to woodland, thus improving the habitat for deer resulting in increasing numbers and a migration to new areas. Afforestation in Ireland can be expected to alter the epidemiology of this disease.

The distribution of deer in Ireland and the location of laboratory confirmed cases are shown in Figure 1. While the number of cases studied is small, it may explain the relatively high proportion from Galway.2

Alternatively, these results may reflect sero positivity in the populations tested. Sera were examined from asymptomatic blood donors in Ireland.3 In East Galway 15% were reactive in a B. burgdorferi Immuno Fluorescent Antibody (IFA) test but only 5% of those from Dublin were positive. The prevalence of antibody in the sera of Irish patients referred for laboratory diagnosis was 14% and this is similar to the level of antibody in specimens from England and Wales (11% - 16%) tested at the same centre.

HOW CAN LYME DISEASE BE PREVENTED?4

The most common cause of Lyme disease is a bite from an infected tick. Knowing where these ticks are found, avoiding such areas, and (if bitten) promptly removing the tick are the primary preventive measures. Persons living in or visiting high risk areas should take the following precautionary measures:-
1. When walking in tall grass, woods, or dunes where ticks may be found, wear a long-sleeved shirt, long pants, high socks (with pants tucked tightly into the socks) and footwear. Apply tick repellant when in endemic area.

2. Conduct daily "tick checks" after possible exposure. The ticks are most often found on the thigh, flank, arms, underarms, and legs, and are very small. Look for new "freckles".

3. To remove a tick use a tweezers. If methylated spirit is dabbed on the area, removal is made easier. Try and avoid damaging the tick when removing. Grip the tick firmly and pull it straight out.

4. Apply an antiseptic to the bitten area.

5. Know the symptoms of Lyme disease. If you have been in an area where ticks are found between May and early Autumn and you develop such symptoms, particularly the skin rash and/or "flu" symptoms, see your Doctor promptly for evaluation and treatment.
DISTRIBUTION OF LYME DISEASE AND OF DEER IN IRELAND

- Concentration of deer (adapted from Gray et al.)

Belfast 2 cases

Galway 4 cases

Dublin 7 cases
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2. Cryan B., Cutler S., Wright D.J.M.
Lyme Disease in Ireland.

3. Gray J.S., Smith H.V., McKenzie G.
Sero prevalence of Lyme borreliosis in asymptomatic humans in selected areas in Ireland.
Abstracts of the IV International Conference on Lyme Borreliosis 1990; B. 40.

Massachusetts Department of Public Health, Boston.
BABESIOSIS

Babesiosis is a malaria-like disease caused by the intraerythrocytic parasite Babesia. The disease principally affects animals, but may occasionally affect humans when it presents with fever, fatigue, and haemolytic anaemia. The first cases in animals were described by Victor Babes in Romania in 1888 and the genus was named Babesia in his honour. The third recorded case of Redwater (Babesiosis in man) was described in an Irish patient by Fitzpatrick et al in 1969. Three further cases have been described, one by Clarke et al in 1989 and two by Egan et al in 1990. The condition has been described in both North America and Europe, but with different clinical and epidemiological features.

In Europe cases are due principally to B. divergens, which is transmitted by the Ixodes ricinus tick. The disease has usually been described in people who have had a previous splenectomy, where it follows a fulminant, generally fatal course.

MODE OF TRANSMISSION

B. Microti is transmitted during the summer months by bite of nymphal Ixodes ticks (I. dammini) carried by voles or mice. The adult tick is normally found on deer (who are not infected by the parasite). The vector of B. bovis and B. divergens in Europe appears to be I. ricinus.
INCUBATION PERIOD

One to twelve months; shorter in asplenic individuals.

PREVENTIVE MEASURES

Persons who have had their spleens removed should be informed of the particular risk and may wish to take the following precautions:

1. When walking in tall grass, wear a long sleeved shirt, long pants, high socks with pants tucked tightly into the socks and footwear.

2. Apply a tick repellant when in endemic areas.

3. Conduct daily tick checks after possible exposure. To remove a tick use a tweezers. If methylated spirit is dabbed on the area, removal is made easier. Try and avoid damaging the tick when removing. Grip the tick firmly and pull it straight out.

4. Apply an antiseptic to the bitten area.
REFERENCES:

1. Fitzpatrick J.E.P., Cotton Kennedy C., McGeown M.G., Oreopoulos D.G., Robertson J.H., Soyannwo M.A. 
   Further Details of Third Recorded Case of Redwater (Babesiosis) in Man. 
   British Medical Journal 1969 : 4 : 770-772

2. Clarke C.S., Rogers E.T. and Egan E.L. 
   Babesiosis: under-reporting or case-clustering? 

3. Egan Ernest L., Duggan C. 
   Blood 1990 (Abstract) 
   Human Babesiosis divergens treated with Imidocarb dipropionate with a note on clinical diagnosis.

4. Babesiosis: ICD-9 088.8
ORF VIRUS DISEASE

ORF Virus Disease is due to a virus which is transmitted to man by contact with infected sheep or goats.

In man the lesion is usually singular and on the hands, arms or face. It is maculopapular or pustular progressing to a weeping nodule measuring about 3cm and lasts for about a month. It occurs most commonly in those who handle sheep including abattoir workers and in some countries such as New Zealand it is considered an important occupational disease. Bottle feeding of lambs presents a risk.

In sheep the primary lesion develops on the skin of the lips and then progresses from the pustular stage to form crusts or large scabs. Occasionally, lesions are found on the feet. The disease lasts for one to four weeks.

The virus is highly resistant to desiccation (remaining alive for years on dried scabs) and may persist in the environment and on the animal's skin and hair. It is transmitted through broken skin by contact with the infected animal or contaminated equipment and housing. It has an incubation period of 3-6 days. Susceptibility is universal but following recovery there is some degree of immunity.

Control depends on good personal hygiene such as the washing of hands and arms with soap and water after handling sheep or objects they may have contaminated. Gloves may give extra protection when handling known infected sheep. As human infection in man may follow the administration of live orf vaccines to sheep, care should be taken when using such vaccines.