LYME DISEASE V2.1

Comments from the Expert Advisory Group

- Lyme disease (also known as Lyme borreliosis) is an infection caused by borrelia bacteria and is spread through the bite of an infected tick to a person.

- Lyme disease can affect anyone but is most common amongst those who spend time in grassy or heavily wooded areas or are in contact with certain animals e.g. deer and sheep. Most cases occur in the summer and autumn.
- Only a small number of individuals will develop Lyme disease following a tick bite. However, early identification of Lyme disease with prompt and appropriate antibiotic therapy is important to minimise the likelihood of the development of late stage infection and/or long term complications of Lyme disease.
- Lyme disease from an infected tick bite can be prevented if the tick is removed within 36 hours. If tick remains on the skin, carefully remove it as soon as possible. Link to instructions.
- Testing of removed ticks is not recommended (unless in a research setting) as the presence of borrelia bacteria is not a reliable predictor of the development of infection in humans.
- Clinical features initiated by Lyme disease may take months or years to resolve even after treatment for several reasons, including alternative diagnoses, reinfection, treatment failure, immune reaction, and organ damage caused by Lyme disease

Diagnosis of Lyme Disease

Lyme disease is classified into stages: early localised disease (erythema migrans), early disseminated disease, and later stage infection. Presenting symptoms, method of diagnosis and treatment pathways differ between the stages. Additional information is available from this factsheet from the Health Protection Surveillance Centre (HPSC)

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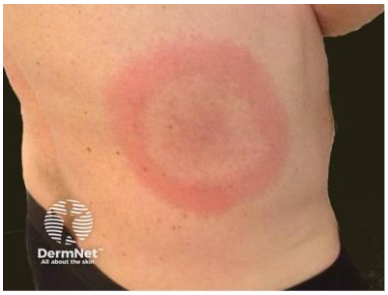
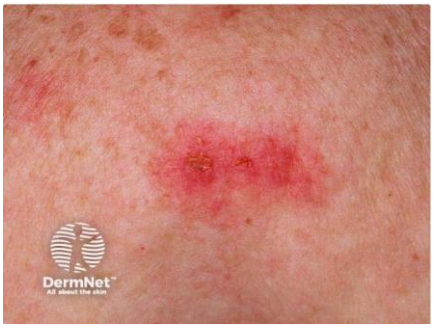
Early localised disease (erythema migrans)

- Erythema migrans should be diagnosed and treated **without laboratory testing** as antibodies to borrelia bacteria take several weeks to develop. Serological testing is not indicated before or after antibiotic treatment of erythema migrans.
- Early localised disease is a clinical diagnosis:
    - Assess for tick exposure risk
    - More than two-thirds of tick bites in adults involve the limbs; more than three-quarters of tick bites in children involve the head and neck.
    - Erythema migrans may present as a 'bulls-eye' skin rash in 70% of adults and 50% of children. It is not usually itchy, hot or painful but increases in size and may sometimes have a central clearing.
    - Rash usually develops between 3 to 30 days after a tick bite and lasts for several weeks at site of tick bite.
    - Patients may also complain of influenza-like symptoms such as headache, sore throat, neck stiffness, fever, muscle aches and general fatigue.
    - Consider the Health Protection Surveillance Centre Diagnostic Support Tool

- Be aware that a rash that is not erythema migrans can develop as a reaction to a tick bite. This rash usually develops and recedes within 48 hours from the time of the tick bite.

<table>
<tr><th colspan="2">Erythema migrans vs bite reaction
Note: rashes and skin conditions can appear different on black or brown skin.</th></tr>
<tr><td>Erythema migrans
Usually NOT itchy, hot or painful
Flat, red macule or papule at bite site
May appear from 3 days to 30 days after tick bite and lasts for several weeks</td><td> 
Image 1: Erythema migrans
Image source: DermNet</td></tr>
<tr><td>Bite reaction
Usually hot, itchy and painful
Often raised papule, central punctum
Usually develops and recedes within 48 hours</td><td> 
Image 2: Insect bite
Image source: DermNet</td></tr>
</table>

Early Disseminated Disease and Later Stage Infection

- Use a combination of clinical presentation and serological testing in patients with early disseminated disease or later stage infection.
- Clinical presentation may include:
    - Severe flu-like illness, musculoskeletal, neurological, cutaneous or cardiac symptoms
- Discuss case with Microbiology/ID specialist including the urgency of specialist review and advice on antibiotic therapy.
- Antibodies to borrelia bacteria are usually detectable within 4-8 weeks of infection. Patients with late-stage infection are rarely seronegative and usually have very strongly positive antibody tests.
- Testing for Lyme disease should only be performed by an accredited laboratory with quality systems based on ISO15189 using evidence based methods that have been appropriately validated or verified for use in that laboratory.
- Test results should be interpreted in the context of the clinical features. In some assays a positive test may reflect cross reacting antibodies. Detection of antibodies is not a reliable indication of current infection as antibodies may reflect infection in the past. Other specialised investigations may be necessary for confirmation of a positive result.
- Visit HPSC website for further information

Treatment

When to administer antibiotics:

- The risk of Lyme disease is very low if a tick has been attached less than 36 hours. If a tick has been attached for greater than 36 hours or if it is not possible to ascertain duration of tick attachment post-exposure antibiotic prophylaxis may be considered.
- All patients with clinical features diagnosed as Lyme disease should be treated with appropriate antibiotics for the recommended duration
- Appropriate antibiotics minimise the likelihood of the development of late stage infection and long-term complications of Lyme disease through a) post-exposure prophylaxis or b) early treatment of erythema migrans.
- Antibiotics are not recommended where Lyme disease has previously been adequately treated (post-Lyme disease syndrome) – there is no demonstrable clinical benefit from prolonged antibiotic therapy and the risk of harm outweighs the benefit. Supportive management should be offered (e.g. management of chronic pain, fatigue, depression, sleep disturbance). Seek specialist advice if necessary.
- Some people may experience a Jarisch-Herxheimer reaction in response to antibiotic treatment of Lyme disease. It is an acute febrile illness which can cause an exacerbation of symptoms (fever, chills, muscle pain, headache). The reaction is self-limiting, usually resolving within 24 to 48 hours and does not usually warrant stopping treatment.

POST-EXPOSURE PROPHYLAXIS OF LYME DISEASE			
As infection risk is low and Lyme disease is readily treatable once symptoms develop, watchful waiting in case of contraindications to doxycycline (e.g. in pregnancy) is recommended.			
Drug	**Dose**	**Duration**	**Notes**
1st choice option			
Doxycycline	Children less than 12 years of age 4.4 mg/kg (max 200 mg) Adults and children 12 years and older 200 mg	Single dose	See additional information below for: 1. Safety Statement on use of doxycycline in children 2. Sample calculation for paediatric dosing and administration advice Contraindicated in pregnancy Advise to take with a glass of water and sit upright for 30 minutes after taking Absorption of doxycycline significantly impaired by antacids, iron/ calcium/ magnesium/ zinc-containing products and should be separated by at least 3 hours

See next page for the treatment of early localised disease/erythema migrans without evidence of disseminated disease

TREATMENT OF EARLY LOCALISED DISEASE/ERYTHEMA MIGRANS WITHOUT EVIDENCE OF DISSEMINATED DISEASE			
Drug	**Dose**	**Duration**	**Notes**
1st choice options			
Doxycycline	Children 8 to 11 years of age 2.2 mg/kg every 12 hours (max 100 mg every 12 hours) Adults and children 12 years and older 100 mg every 12 hours	10 days	Contraindicated in pregnancy Advise to take with a glass of water and sit upright for 30 minutes after taking Absorption of doxycycline significantly impaired by antacids, iron/ calcium/ magnesium/ zinc-containing products and should be separated by at least 3 hours Risk of photosensitivity.
First alternative (1st line choice in pregnancy and children under 8 years of age)			
Amoxicillin	Children less than 12 years of age 30 mg/kg every 8 hours (max. 500 mg every 8 hours) Adults and children 12 years and older 500 mg every 8 hours	14 days	Avoid in penicillin allergy
Second alternative			
Azithromycin	Children 6 months to 12 years 10 mg/kg every 24 hours (max 500 mg every 24 hours) Children over 45 kg dose as per adults Children less than 6 months seek specialist advice Adults and children 12 years and older 500 mg every 24 hours	7 days	See macrolide warning and check drug interactions before prescribing Macrolides should be used with caution in pregnancy Tablets: Take with or without food. Take 1 hour before or 2 hours after antacids. Capsules: Take 1 hour before or 2 hours after food/ antacids.

Early disseminated disease or later stage infection
Refer to microbiology or infectious disease specialist

Safety statement on the use of doxycycline in children under 8 years of age

Patients and prescribers should be aware that the use of doxycycline in children under 8 years of age is unlicensed in Ireland. Safety data from research in Europe and the US in recent years has provided reassurance that short courses of doxycycline are safe in children under 8 years of age and are not likely to produce either dental discoloration or enamel hypoplasia. This has been endorsed by the American Association of Paediatrics (AAP Red Book 2018) and Children's Health Ireland (CHI) Group.

Sample calculation

Child requiring prophylaxis using Doxycycline 100 mg unlicensed soluble tablets

Child weight=15 kg (specify child weight on prescription)

Dose: 4.4 mg per kg

15 kg x 4.4 mg/kg = 66mg dose required

How to disperse tablet to give a part dose:

Dissolve 1x 100 mg soluble doxycycline tablet in 5 mL of water

100 mg=5 mL so 66 mg=3.3 mL (draw up and give 3.3 mL using 5ml syringe supplied by pharmacist).

For young babies use water that has been freshly boiled then cooled.

Discard remaining dose, each dose should be freshly made.

To improve palatability, squash/fruit juice can be added or the child can drink juice straight after taking the dose.

Patient Information

HSE A to Z Lyme disease