Lyme disease Awareness e-learning course as at August 2025

green bar denotes changes of media within same screen. denotes video background

1

2

3

4

5

6

7

8

9

10

11

12

13

Introduction

Question 4 of 4

test yourself...!

How long do infected ticks needs to be attached for before they can transmit Lyme disease?

- at least one hour
- there is no proven minimum amount of time
- at least twenty-four hours
- at least twelve hours

Please click on the answer you think is correct.

14

Question 4 of 4

Well done! You're correct.

There is **no proven minimum amount of time** for which infected ticks need to be attached to transmit Lyme disease.

Thank you for answering those 4 questions.

continue

15

Introduction

contents

- Introduction to Lyme Disease
- Ticks
- Prevention
- Checking for Ticks
- Removing Ticks Safely
- Symptoms, Diagnosis & Treatment
- Quiz

16

Lyme Disease Awareness

Introduction to Lyme Disease

Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

17

Introduction to Lyme Disease

- lyme borreliosis
- bacterial infection from tick bite
- common early symptoms include rashes & flu-like illness
- but can affect multiple systems in the body
- importance of early diagnosis and adequate antibiotic treatment for a full recovery
- can cause wide range of serious health issues
- preventable!

18

Introduction to Lyme Disease — Who is at Risk?

19

Introduction to Lyme Disease — Who is at Risk?

Context of tick-borne infection transmission

Facebook study by Lyme Resource Centre (2021)

20

Introduction to Lyme Disease — Who is at Risk?

at work
higher risk groups

- farmers
- forestry & agricultural workers
- gardeners & landscapers
- gamekeepers
- vets
- nature conservation staff
- park & wildlife mgt. workers
- outdoor pursuits instructors
- armed forces personnel
- ecologists
- academics

21

Introduction to Lyme Disease

Keeping Risks in Perspective

- enjoy the outdoors!
- not all ticks are infected

22

Introduction to Lyme Disease

Protect Yourself - Be 'Tick Aware'

- avoiding bites in the first place
- checking for & safely removing ticks
- knowing Lyme disease symptoms

23

Introduction to Lyme Disease

History

- first diagnosed in 1975
- but not a new disease

24

Introduction to Lyme Disease

History

- first diagnosed in 1975
- but not a new disease
- Otzi the Iceman

25

Introduction to Lyme Disease

History

- first diagnosed in 1975
- but not a new disease
- Otzi the Iceman
- found in over 80 countries
- most common in forested regions of Northern Hemisphere

26

Introduction to Lyme Disease

Tick-borne Infections

Lyme disease caused by bacterium *borrelia burgdorferi*

27

Introduction to Lyme Disease

Tick-borne Infections

Lyme disease caused by bacterium *borrelia burgdorferi*

But many other tick-borne infections:

BACTERIA	VIRUSES	PARASITES
Anaplasma	Tick-borne encephalitis	Babesia
Ehrlichia		Toxiplasmosis
Bartonella		
Brucella		
Q fever		
Tularemia		

'Nature's Dirty Needles'

28

Introduction to Lyme Disease

How Common is Lyme Disease?

- difficult to know true figure
- but cases are definitely on the increase
- estimated at between 8,000 - 10,000 per year in the U.K. (Scotland accounts for more than 25% of cases)
- incidence in many European countries higher than U.K.
- estimated to be around 500,000 cases annually in U.S.A.
- most commonly contracted in spring and summer

29

Introduction to Lyme Disease

Cases by Age

A 2019 study, looking at hospital data from England & Wales, found higher incidence observed in:

- adults aged 45 - 65
- children aged 6 - 10

Tulloch, J.S.P., Decraene, V., Christley, R.M. *et al.* Characteristics and patient pathways of Lyme disease patients: a retrospective analysis of hospital episode data in England and Wales (1998–2015). BMC Public Health 19, 931 (2019)

30

Lyme Disease Awareness

Introduction to Lyme Disease

Ticks

- Prevention
- Checking for Ticks
- Removing Ticks Safely
- Symptoms, Diagnosis & Treatment
- Quiz

31

Ticks

What are Ticks?

- *not* insects
- small, blood-sucking arachnids
- the tick most likely to bite humans is the sheep tick - *Ixodes Ricinus*, also called the deer tick or castor bean tick

sheep tick
Ixodes Ricinus
adult female

32

Ticks

sheep ticks feed on a wide variety of birds, reptiles & mammals

33

Ticks

Tick Life Cycle

- egg → larva → nymph → adult
- feed only once in each stage

ticks on adult thumb nail

image courtesy of Lyme Disease Action

34

Ticks

Tick Life Cycle

- egg → larva → nymph → adult
- feed only once in each stage
- small size
- most human bites by nymphs
- anaesthetic in saliva

Most Lyme Disease sufferers are unaware of having been bitten!

photo courtesy of University of Bristol

35

Ticks

Where Are Ticks Found?

- need moist air to survive
- live in vegetation, in areas with moderate to high rainfall
- grassy or forested places - even parks & gardens

36

Ticks

Where Are Ticks Found?

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37

Ticks

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38

Ticks

Where Are Ticks Found?

- need moist air to survive
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39

Ticks

Tick Distribution - U.K.

very widespread coverage

Tick Surveillance Scheme map

- shows records of sheep ticks
- highest risk areas

Tick numbers on the rise, due to:

- climate change
- tree planting (afforestation)
- land disuse

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40

Ticks

How Do They Feed?

- spend most time on ground
- climb to tips of low vegetation
- attach to animals as they brush past

41

Ticks

42

Ticks

How Do They Feed?

- ticks often move around to find a suitable bite site

43

Ticks

How Do They Feed?

- ticks often move around to find a suitable bite site

tick embedded in skin

photo courtesy of Lyme Disease Action

44

Ticks

How Do They Feed?

- ticks often move around to find a suitable bite site

tick under watch strap

photo courtesy of Lyme Disease Action

45
Ticks
How Do They Feed?
ticks often move around to find a suitable bite site
bodies can swell as they ingest blood
disease transmission more likely the longer a tick is attached
not all UK ticks carry Borrelia - estimated at between 0 and 20%

46
Lyme Disease Awareness
Introduction to Lyme Disease
Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

47
Prevention
Being 'Tick Aware'
Being outdoors and connecting with nature positive for both physical & mental health
Could be during leisure time, and/or for work
For tick bites and potential illness, prevention much better than cure!

48
Prevention
No vaccine against Lyme disease currently available
Key prevention measures include...

49
Prevention
Carry a tick removal tool or kit

50
Prevention
Keep to well-maintained paths

51
Prevention
Apply a skin repellent effective against ticks
Saltidin / Picaridin
DEET
IR3535
oil of lemon eucalyptus

52
Prevention
Wear
long sleeves to cover bare skin

53
Prevention
Wear
long sleeves to cover bare skin
long trousers, tucked into socks

54
Prevention
Wear light-coloured clothes
Apply insecticide (Permethrin)

55
Prevention
Use a blanket if sitting / lying on the ground

56
Prevention
Use anti-tick treatment for pets

57
Knowledge Check Question
Tick numbers are on the rise, for reasons including:
changes to climate, such as increased rainfall
tree planting, resulting in greater numbers of deer
disused land, and more small animal hosts
all of the above
Please click on the *single* answer you think is correct.

58
Knowledge Check Question
That's right - well done!
Tick numbers are increasing due to all the reasons stated.
continue

59
Lyme Disease Awareness
Introduction to Lyme Disease
Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

60
Checking for Ticks

61

Checking for Ticks

Adults mainly bitten on legs and arms

Children mainly bitten above the waist

15%
46%

20%
28%
12%

source: Robertson *et al.* 2000 Eur J Epiderm 16: 647-652

62

Checking for Ticks

Remember - ticks can be tiny!

photo courtesy of Lyme Disease Action

63

Checking for Ticks

Remember - ticks can be tiny!

photo courtesy of Lyme Disease Action

64

Checking for Ticks

- check carefully, all over the body
- use a mirror, or get someone to help you
- showering
- tumble drying outdoor clothes

65

Checking for Ticks

learn more

66

Dogs and Lyme Disease

Dogs

- common symptoms
- early antibiotic treatment
- but avoiding bites is best, e.g. treatments such as Frontline
- grassy or wooded areas? Check for ticks
- quick once over before coming inside
- comb fingers throughout fur
- also check face, ears, feet & neck
- feel a bump? Part fur to examine

67

Dogs and Lyme Disease

68

Lyme Disease Awareness

Introduction to Lyme disease
Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

69

Removing Ticks Safely

- remove attached ticks ASAP
- reduces risk of Lyme & other infections

Tick Removal Kit

- tick removal tool
- magnifying glass
- antiseptic
- small, sealable bag

70

Removing Ticks Safely

Tick Removal Tools

71

Removing Ticks Safely

Tick Removal Tools

credit card tool

tick twisters

fine-nosed tweezers

tick forceps

72

Removing Ticks Safely

Removing a Tick

- use tool to grasp tick as close to skin as possible
- gently pull upwards
- use this method only!

73

Lyme Disease Awareness

Introduction to Lyme disease
Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

74

Symptoms

- wide range of symptoms
- can vary from person to person
- depend on how far the infection has progressed
- may be non-specific
- can go unnoticed, or may be misdiagnosed

Lyme disease is a bacterial infection treated with higher than usual dosages of antibiotics

Early diagnosis & treatment usually mean a complete cure

But late or missed diagnosis can result in debilitating symptoms which may last for years

75

Symptoms

Early Lyme Disease

- symptoms usually appear within days or weeks of a bite from an infected tick
- typically a skin rash, and/or flu-like symptoms
- patient often not aware of any tick bite

76

Symptoms

early Lyme disease
typically days or weeks after bite

Skin Rash

- erythema migrans (EM)
- about 2/3 of Lyme patients *notice* a rash
- most are uniformly red, but can have classic 'Bull's Eye' appearance
- can vary in shape & size, and appear in multiple places
- misdiagnosis
- an EM rash is diagnostic of Lyme disease : begin antibiotic treatment

erythema migrans rash (arm)
photo courtesy of Lyme Disease Action

77

Symptoms

erythema migrans rash (armpit)
photo courtesy of Lyme Disease Action

78

Symptoms

erythema migrans rash (leg)
photo courtesy of Lyme Disease Action

79

Symptoms

early Lyme disease
typically days or weeks after bite

Flu-like symptoms

- with or without EM rash
- can include chills, tiredness, high temperature, stiff neck, swollen glands, muscle or joint pain
- potential to be misdiagnosed as 'summer flu'

80

Symptoms

Late Lyme Disease

- further symptoms can develop in the weeks, months or even years following an infected tick bite
- borrelia bacteria can spread to every system in the body
- can cause a multitude of different symptoms, which can come and go

81

Symptoms

late Lyme disease
weeks, months or years after bite

Nervous System

- numbness, tremors, twitching, weakness or pain in limbs
- paralysis of facial muscles (facial palsy)
- memory problems, anxiety or difficulty concentrating
- meningitis
- dizziness

82

Symptoms

late Lyme disease
weeks, months or years after bite

Cardiovascular System

- chest pain
- shortness of breath
- palpitations / irregular heart beat
- inflammation of the heart

83

Symptoms

late Lyme disease
weeks, months or years after bite

Joint Pain & Swelling

- inflammatory arthritis
- more common in the U.S.A.

84

Symptoms

When To See Your GP

- if you develop any symptoms after a tick bite, or suspected bite
- explain concerns
- take photos of any rash
- mark initial rash boundary
- information & training for GPs
- familiarise yourself with Lyme Disease Toolkit, and NICE Guideline

LYME DISEASE Toolkit

NICE National Institute for Health and Care Excellence

85

Diagnosing Lyme Disease

Difficulties Diagnosing

- tick bites often go unnoticed
- 'The Great Imitator' - symptoms shared with many other conditions
- symptoms vary from person to person
- lack of awareness
- existing blood tests are unreliable

86

Diagnosing Lyme Disease

Is Laboratory Testing Necessary?

- can be helpful in some situations
- BUT main method of diagnosis is physical examination & detailed clinical history
- presence of EM rash is diagnostic - begin treatment right away

87

Treating Lyme Disease

Treatment

- no standardised treatment plan
- typically short-term oral antibiotics to treat Lyme infection
- specialist and/or emergency care for symptoms where appropriate
- most people make a full recovery

88

Treatment

Persistent Symptoms

Post-Treatment Lyme Disease Syndrome (PTLDS)

- for some, short-term antibiotics not effective
- develop symptoms similar to fibromyalgia or CFS
- can last for months or years
- estimated to affect 10-20% of Lyme disease patients
- cause(s) unclear
- persistent infection is only one possible explanation

89

Treatment

Living with PTLDS

- multi-system illness with severe & ongoing problems

category	symptoms
musculoskeletal	muscle pain; fluid accumulation and/or pain in joints; nerve pain & weakness
cardiac	ongoing heart problems
neurological	extreme fatigue; nerve pain & weakness; numbness & tingling in extremities; psychiatric disorders
cognitive	'brain fog'; memory problems; speech difficulties; problems thinking, concentrating, processing information or following conversations
sensory	problems with vision & hearing

- major negative impact on quality of life
- compassionate & individualised treatment required, but difficult to secure
- more research into causes, identification & treatment needed

90

Knowledge Check Question

Please consider the following statement:

Early symptoms of Lyme disease include an expanding skin rash, and/or flu-like symptoms.

- true
- false

Please click on the *single* answer you think is correct.

91

Knowledge Check Question

Sorry, but that's incorrect!

An expanding skin rash, and/or flu-like symptoms *are* early symptoms of Lyme disease.

continue

92

Patient Story

Olivia Brailey, from Edinburgh

While on holiday with my family in Glencoe and Skye in June 2021, I regularly had to remove ticks from my puppy after walks in the garden. I knew all about Lyme disease and the danger that ticks pose. Each evening I did a tick check on myself, and even asked my mother to check places I could not see.

About four days after I returned home, I found an engorged tick in my bed but assumed this had been attached to the dog.

A week later, I developed a large oval red rash on the side of my lower leg. I put this down to a horsefly bite, as it was itchy and had a white centre. It didn't look like a bulls-eye Erythema Migrans (EM) rash sometimes seen after a tick bite.

93

Patient Story

One week on, I received my first Covid vaccine. When 'flu-type symptoms and fatigue lasted beyond 5 days I realised it wasn't vaccine side effects, so was then tested for Covid. It was only when the test result was negative that we put the jigsaw together and realised… I was suffering with Lyme disease! The evidence all pointed to it….travel to a tick endemic area, an engorged tick in my bed, a rash appearing a few weeks later on my leg (even though not bitten there) and the 'flu symptoms and fatigue in summer.

My GP agreed to prescribe three weeks of the antibiotic doxycycline as this was the recommended treatment in the NICE Guideline for Lyme disease.

94

Patient Story

After almost three weeks of treatment, I was still experiencing fatigue, and neurological symptoms - forgetfulness, struggling to find the right words, and my concentration at work was poor. I bumped my car twice during this period. By now I was deeply worried. When I called the GP again, he admitted to not knowing what to do - fortunately, my mum, a pharmacist, was able to guide me. The GP then prescribed another antibiotic - amoxycillin - for a further three weeks but unfortunately at only half the high dose (1g three times a day) recommended by NICE for Lyme disease. I returned to have the correct dose prescribed.

I went away on my outdoor holiday, still feeling sick from the constant antibiotics but looking forward to lots of hill climbing and kayaking. On some days, I was so fatigued that instead of climbing hills, I went back to bed and fell asleep instantly. It was so unlike me, and my family were all worried.

95

Patient Story

Olivia Brailey, 24
(& Jasper, 18 months)
March 2022

The brain fog, poor concentration and memory loss continued for a few more months beyond treatment, before fully resolving. I succumbed to several viruses and had constant waves of fatigue for months, before finally beginning to feel well once again.

I am glad to say that I now feel completely recovered. But I want to share this experience so others know that:

- Lyme disease is often difficult to diagnose and spot;
- sometimes healthcare professionals are not fully aware of the NICE guideline or RGCP toolkit for treating Lyme disease; and
- early diagnosis and appropriate treatment really matters to prevent longer term serious illness.

continue

96

Symptoms

Reminder: Seeking Medical Advice

- **not all ticks carry Lyme disease or other infections**
- **but DO see your GP if you develop symptoms after a tick bite, or suspected bite**

expanding skin rash (erythema migrans)
flu-like symptoms - chills, tiredness, high temperature, neck stiffness, swollen lymph nodes, muscle or joint pain
facial paralysis (Bell's Palsy)
pain, numbness or tremors in limbs
problems with memory or concentration
unexplained neurological symptoms
fatigue
headaches, a stiff neck or sensitivity to light
heart problems

Remember:

- **non-specific summer 'flu symptoms could be a sign of Lyme**
- **most people don't remember a tick bite!**

97

Lyme Disease Awareness

Introduction to Lyme disease
Ticks
Prevention
Checking for Ticks
Removing Ticks Safely
Symptoms, Diagnosis & Treatment
Quiz

98

Conclusion and Quiz

Quiz

to release your completion certificate, you must successfully complete a short quiz

there are ten multiple-choice questions

each question only has one correct answer

the pass mark is 80%

good luck !

start quiz

99

Quiz

Question 1 of 10

Which of the following is a recommended method for removing a tick which is embedded in skin?

- squashing the tick between your fingers
- using fine-nosed tweezers to pull up and out
- applying heat to the exposed part of the tick
- rubbing alcohol onto the tick

Submit

100

Quiz

Question 2 of 10

For how long does an infected tick need to be attached before it can transmit the bacteria which causes Lyme disease?

- at least one hour
- at least twenty-four hours
- there is no proven minimum time of attachement
- at least forty-eight hours

Submit

101

Quiz

Question 3 of 10

Consider the following statement:

Lyme disease cannot be diagnosed without evidence of a tick bite.

- true
- false

Submit

102

Quiz

Question 4 of 10

Which of the following symptoms can occur in early-stage Lyme disease?

- fatigue, and other flu-like symptoms
- paralysis of muscles in the face
- an expanding red skin rash
- all of the above

Submit

103

Quiz

Question 5 of 10

When should you always arrange to see your GP about Lyme disease?

- after you have been bitten by a tick
- following a suspected tick bite
- before travelling to a tick-infested area
- following a known or suspected tick bite, and the development of Lyme disease symptoms

Submit

104

Quiz

Question 6 of 10

When walking in woodland, which of the following could help prevent tick bites?

- wearing long trousers, tucked into socks
- walking through tall grass or undergrowth
- wearing shorts or a skirt, with bare legs
- avoiding using established paths

Submit

105

Quiz

Question 7 of 10

Please complete the following sentence

Children are typically bitten by ticks...

- ...above the waist
- ...below the waist

Submit

106

Quiz

Question 8 of 10

Why is routinely checking for ticks after being outdoors important?

- most Lyme sufferers don't remember being bitten
- ticks can be very small and difficult to spot
- ticks often bite the body in places which are hard to see
- all of the above

Submit

107

Quiz

Question 9 of 10

In respect of diagnosing Lyme disease, which of the following is TRUE?

- antibiotics can only be prescribed after a positive blood test
- a negative blood test excludes the diagnosis of Lyme disease
- an E.M. rash is considered diagnostic
- clear evidence of a tick bite is needed for a diagnosis

Submit

108

Quiz

Question 10 of 10

Following a bite from an infected tick, an erythema migrans expanding skin rash:

- may or may not develop
- could have a 'bulls-eye' appearance, or be uniformly red
- can be circular, oval or irregularly shaped
- all of the above

Submit

echo3
CONGRATULATIONS
YOU PASSED
SCORE = 10 / 10
SUBMIT SCORE