

# The response to Lyme disease as an emerging threat

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## Introduction and background

Lyme disease (Lyme borreliosis) is a zoonotic infection transmitted by the bite of infected ticks. *Borrelia*, the causative organism, has evolved to survive in the warm-blooded vertebrate host; the main reservoirs in nature being small mammals and ground-feeding birds which are known to carry other emerging tick-borne diseases.

The disease itself affects some animals as well as humans. It has been known in Europe since the end of the nineteenth century and is now the most common vector-borne disease in the northern hemisphere. UK incidence has risen sharply but is acknowledged to be seriously under-reported<sup>1</sup> and knowledge about the impact in the UK is still lacking.

The multi-systemic clinical features of disseminated Lyme disease are broad and variable, often presenting a diagnostic challenge. Lyme disease may be associated with a significant burden of healthcare costs and morbidity.<sup>2</sup>

The UK charity Lyme Disease Action was formed in 2003 in response to the dearth of accurate, evidence-based information about the disease in the UK.

## History of disease emergence

### Mainland Europe

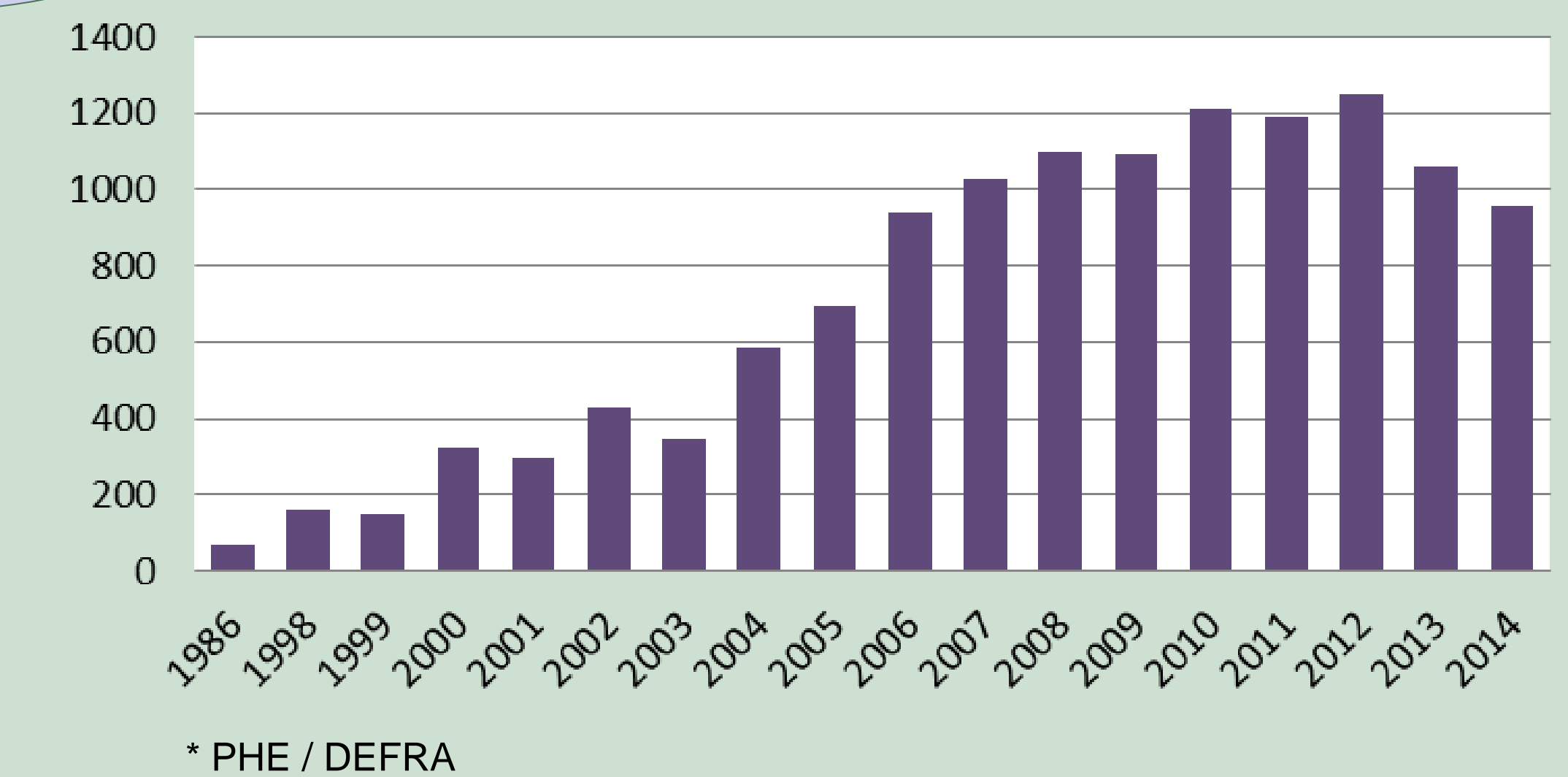
- 1883** Skin rashes first described by German physicians
- 1910** Skin rash Erythema Chronicum Migrans (ECM) linked to tick bite
- 1940** Bannwarth's syndrome (meningitis, nerve pain, facial palsy)
- 1949** Successful antibiotic treatment of ECM rash
- 1970s** Widespread European acceptance of tick bite + rash + neurological symptoms = infection
- 2000** European diagnostic criteria deviate from USA to allow for reduced antigen expression of European *Borrelia* genospecies

### USA

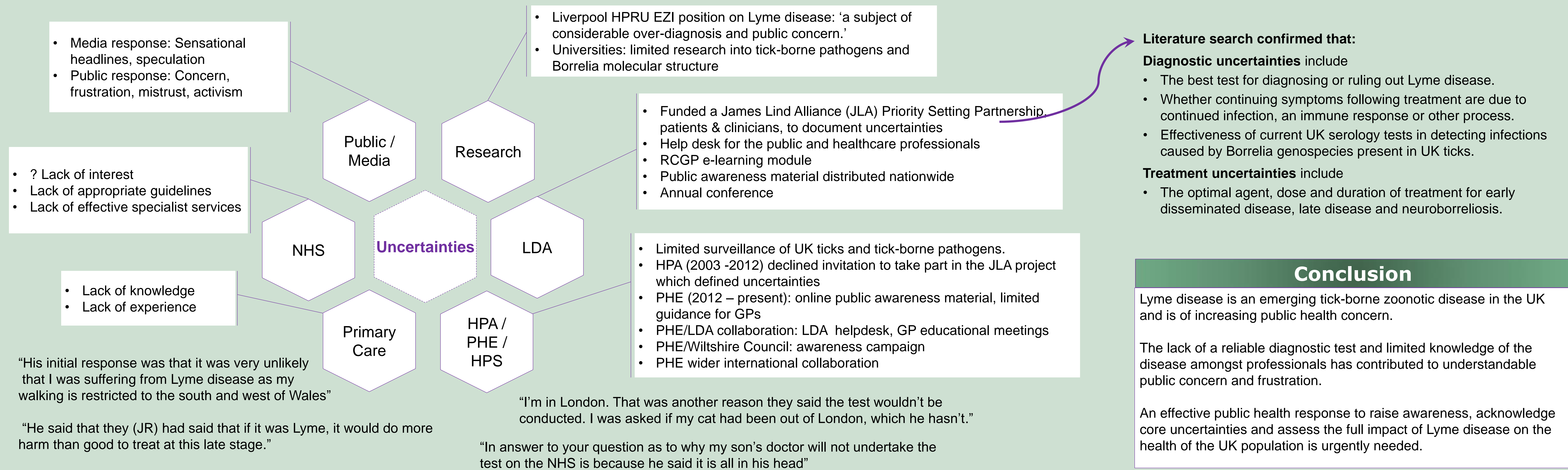
- 1975** Cluster of juvenile rheumatoid arthritis in Old Lyme, Connecticut, named Lyme Arthritis
- 1977** USA Lyme Arthritis recognised as a tick borne disease
- 1981** Bacterium *Borrelia burgdorferi* discovered in American deer ticks and then Swiss sheep ticks
- 1994** Dearborn Conference – 2 tier serology diagnostics

First UK case report  
**1977**

UK laboratory confirmed cases only\*  
Nos. clinically diagnosed unknown



## UK Response



### References

- Evans R, Mavin S, Holden S, Munro A, Gunn G. Lack of accurate information on the prevalence of Lyme disease in the UK. *BMJ*. 2014 Jan;348(March):g2037.
- Lohr B, Müller I, Mai M, Norris DE, Schöffski O, Hunfeld K-P. Epidemiology and cost of hospital care for Lyme borreliosis in Germany: Lessons from a health care utilization database analysis. *Ticks Tick Borne Dis*. Elsevier GmbH.; 2015 Feb;6(1):56–62.



## The Lyme disease James Lind Alliance Priority Setting Partnership

The JLA method is designed to lead to changes in the way research funding is granted, with a view to raising awareness of research questions which are of direct relevance and potential benefit to patients and the clinicians who treat them.

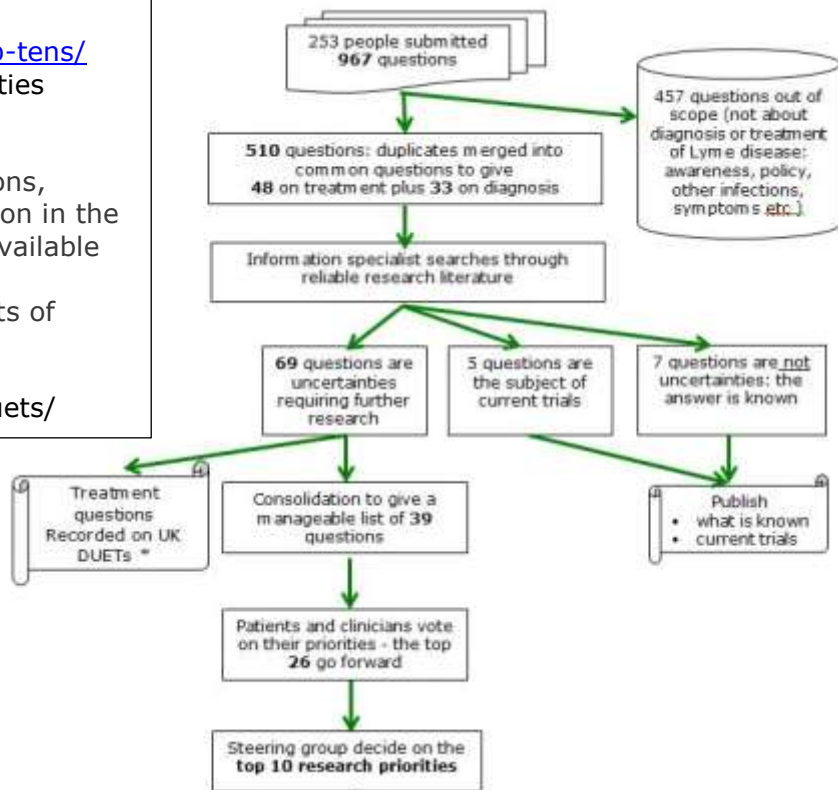
See

<http://www.jla.nihr.ac.uk/top-tens/>  
for the top 10 research priorities

### Researchers, please note:

All of the unanswered questions, regardless of their final position in the list of priorities are publicly available through the UK Database of Uncertainties about the Effects of Treatments (**UK DUETs**).


<http://www.library.nhs.uk/duets/>



## HPRU EZI view of Lyme disease:

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## Clinical Surveillance

Whilst clinical surveillance is potentially an enormous area for applied research, within this theme we have chosen two infections which illustrate different paradigmatic; one (hantavirus) being a truly emerging disease in the UK, and the other (Lyme disease) a subject of considerable over-diagnosis and public concern.

The overall aim is to improve clinical input and quality of diagnostics to support PHE detection and surveillance programmes, and to improve public engagement with related activities of PHE and its partners.



A PHE report notes that there have been 6 cases of hantavirus in the UK between 2012 –2014 and the main risk group appears to be pet fancy rat owners with 32.9% testing positive for hantavirus antibody indicating previous exposure. Occupationally exposed groups had the same level of exposure as the general public and are not thought to be at risk.