



RIPL Update 2021

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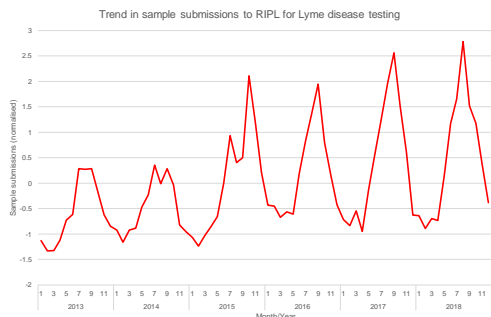
Overview

- Changing demand
- Assay systems
 - Screening assay
 - Immunoblot
 - CSF testing
- PCR testing



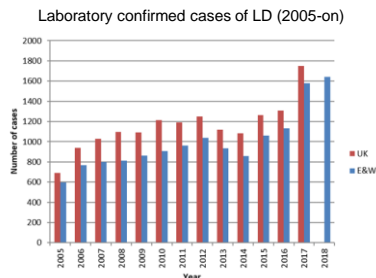
Tick country
Ecotone: transition from woodland to open grassland

NHRI Health Protection Research Unit in Emerging and Zoonotic Infections



Slide Courtesy of Jenny Warner, RIPL

Lyme cases in England & Wales



Actual cases are probably 3-4 × higher



2019 & 2020

Year	Unique samples	Unique patients
2015	16488	14650
2016	17402	15191
2017	18856	16198
2018	20040	17096
2019	24715	21279
2020	14238	12432
Grand Total	111739	92616

Year	Positive samples	Positive patients
2015	1199	1000
2016	1878	1520
2017	2539	2060
2018	2735	2158
2019	2685	2243
2020	2100	1791
Grand Total	13136	9928

NOT case numbers: many are repeats of known cases
Final figures in Zoonosis Report



The 2019 verdict

Lyme disease (Data from the Rare and Imported Pathogens Laboratory, Porton)

The total number confirmed Lyme disease cases were similar in 2018 (1,641 cases) and 2019 (1,639 cases), however, the proportion of acute cases was lower in 2019 (55%) compared to 2018 (69%). As shown in Figure 3, the number of cases peaked during the summer months (third quarter), which corresponds to exposures during the peak times of exposures to ticks in the UK in the spring and summer months.

2020: figures may be delayed as the Zoonoses team are working mostly on COVID



Laboratory testing



- Automated VIsE and pepC10 screen (accuDiag)
- Confirmatory immunoblot (ViraChip)
- Note : antibodies appear slowly. A repeat test after 6 weeks may be needed for ACUTE disease
- Real time PCR
16 S gene target specific to *Borrelia* group (all species)



The AccuDiag test



- Immunetics bought out by Oxford Immunotech
- Commercial decision
- RIPL evaluated suitable assays
- Had to fit NICE recommendations
- Tenders from selected manufacturers
- AccuDiag won
- Marketed under Zeus brand
- Other companies developing C6

PepC10 is a conserved epitope of OspC



Virachip output

Separate assays for IgG & M



CSF testing for Lyme disease

- To demonstrate intrathecal synthesis of antibodies
- If the central nervous system is infected, antibodies are synthesised locally and appear in the CSF
- Some antibody may leak into the CSF from blood which if low level is not proof of neurological Lyme disease
- A serum sample taken on the same day is essential
- We measure protein and immunoglobulin levels in serum and CSF
- We use to adjust for the lower levels of protein & antibody in CSF
- Serum and CSF are tested together
- If the concentration of Lyme antibodies after adjustment for Ig level in CSF is >1.4 x the serum, this is POSITIVE in the CSF
- We also run a pan-borrelia PCR on CSF



Pan-borrelia PCR

- PCR is designed to test for ALL borrelia
- Covers all Lyme strains
- Skin biopsies and ACA
- Synovial fluid
- CSF
- Tissue samples
- Also detects relapsing fever group on blood samples taken during fever.
- e.g. *B. myamotoi*.



TBE

- Central European tick-borne encephalitis virus found in small number of ticks in Thetford Forest & New Forest.
- 2 probable cases in humans 2019-20
- Active referral to RIPL of samples from all unexplained encephalitis cases with CSF pleocytosis in risk areas
- Very few referrals, all negative
- Likely to result from ticks brought in by birds
- Probably been an ongoing event for millennia
- RIPL has tested all relevant CSF samples referred to us for TBE, West Nile Virus since 2003 routinely.
- RIPL PCR for WNV discriminates between WNV and Usutu