

A 5 year observational study of the epidemiology of Lyme borreliosis in Scotland



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Introduction

Lyme borreliosis (LB) is becoming increasingly important in Scotland, especially in the Scottish Highlands. Whilst some patients may remain asymptomatic or suffer only from a self-limiting erythema migrans (EM) rash around the site of a tick bite, the disease can lead to debilitating disease if left untreated.

Although LB has been notifiable in the USA since 1990 few countries in Europe have made LB a compulsorily notifiable disease, therefore it has only been possible to make estimates of incidence based on the reporting of positive tests by laboratories. LB was a notifiable disease in Scotland until 2010 and although the National Lyme Borreliosis Testing Laboratory reported all laboratory confirmed cases, the data held by Health Protection Scotland varied and the reporting of clinical cases was limited. Data is now dependent on electronic data gathering, which is problematic. As there is growing clinical, public, occupational and political interest in the burden of LB in Scotland it is essential that accurate data is collated.

Methods

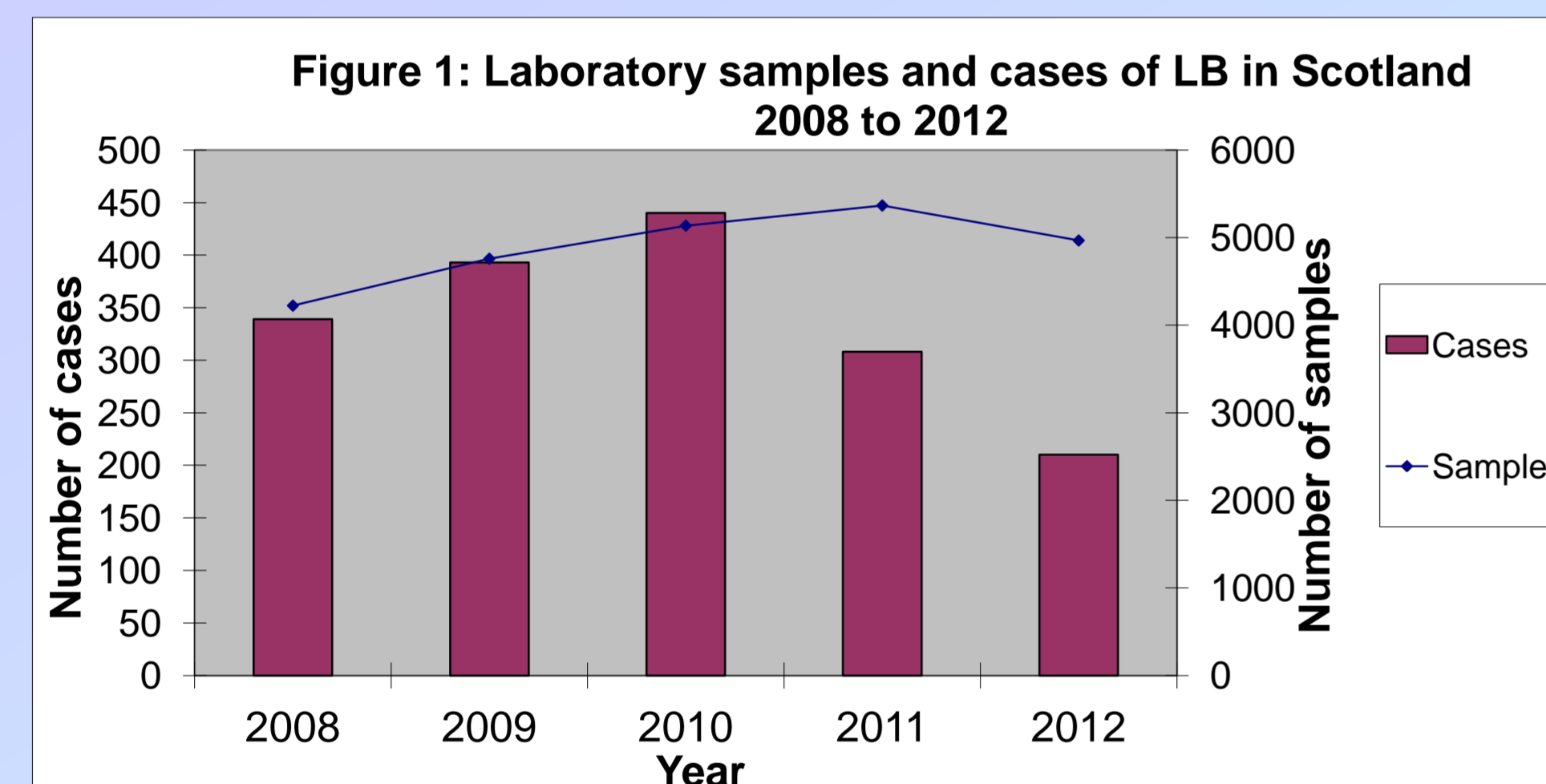
- General demographic data (age/sex/referring laboratory) from all cases of LB confirmed by the National Lyme Borreliosis Testing laboratory from 1st January 2008 to 31st December 2012 was analysed.
- Data (clinical symptoms/ signs, details of any tick bites and if patient considered by medical practitioner to have LB) from questionnaires returned to the laboratory from all new cases within Highland Health Board during this time period was also analysed.

Aim: The aim of this study was to examine the distribution of laboratory confirmed cases of LB in Scotland over a five-year period and to study the clinical spectrum using questionnaire data on those cases from the Scottish Highlands.

Results

Scotland (2008-2012):

The number of laboratory confirmed cases of Lyme borreliosis in Scotland peaked at 440 in 2010 but decreased in the following two years. The number of samples tested peaked in 2011 at 5136 (Figure 1):



There were more cases in males than females (54 vs 46%). The age of patients followed a normal distribution, with a peak in the 50-54 years age group.

Incidence (2008-2012):

The estimated average annual incidence of LB in Scotland was 7.50 per 100,000 population, although incidence ranged from 2.09 per 100,000 population in Lanarkshire to 46.45 per 100,000 population in Highland (Table 1).

Health Board	2008	2009	2010	2011	2012	Total	Estimated average annual incidence/100,000 population
Ayrshire & Arran	8	6	18	6	2	40	2.17
Tayside	51	59	49	36	15	210	10.41
Dumfries & Galloway	10	9	14	7	11	51	6.85
Lothian	40	40	41	21	10	152	3.64
Fife	10	8	9	12	4	43	2.36
Greater Glasgow & Clyde	53	70	113	53	34	323	5.36
Highland	147	169	163	145	102	726	46.45
Lanarkshire	13	22	14	8	2	59	2.09
Borders	2	5	6	3	2	18	3.19
Western Isles	5	5	3	6	2	21	15.88
*Forth valley	-	-	-	11	5	26	-
**Grampian	-	-	-	-	21	21	-
Total no. cases	339	393	440	308	210	1690	-
***Estimated annual incidence for Scotland per 100,000 population	7.81	9.02	9.82	6.74	4.14	7.50	-

*Samples not routinely referred to NLBTL from 2008-2012
**Samples only referred from August 2012
***Calculated minus data from Grampian & Forth valley Health Boards

Highland (2008-2012):

- Represented the majority of new cases (43%) in Scotland
- Questionnaires returned from 532/726 (73%):
 - 69% patients were deemed by the clinician to have LB
 - 55% could recall a tick bite.
 - 44% had EM, a further 16% had a 'rash'
 - 12% had neurological, 23% joint and 1% cardiac symptoms.



Discussion

There has been a continual rise in the number of Scottish cases of LB confirmed by our laboratory since 2003, peaking at 440 cases in 2010, but this may now be stabilising. Although the incidence of LB in Scotland is low (7.50 cases per 100,000 population for 2008-2012), the incidence was 46.45 per 100,000 population in Highland. Approximately 51.7% of the Highland population live in rural locations so are regularly exposed to tick bites during their daily activities. The Highlands may also provide the ideal conditions for tick survival, based on climate, land type and use and density of animals hosts on which to feed.

The low number of patients with EM (44%) is much lower than other studies. Whilst this may reflect the unwillingness of clinicians to diagnose a rash as EM (non EM rash recorded in 16%) it is more likely to reflect the clinical awareness in Highland, with most cases of EM treated empirically without laboratory confirmation, as recommended. Anecdotal reports indicate that perhaps only 20% of cases from some Highland clinicians are referred for laboratory testing, so it is likely that those tested have a more complex clinical picture. Interestingly, only 55% of patients could recall having a tick bite. This information is important for clinicians as LB should be considered not just in those patients with a definite history of a tick bite, but in those that have potentially been exposed to ticks.

Currently, laboratory data is the only way to ascertain the burden of LB in Scotland, although this data is flawed. We believe the burden of LB is much higher than recorded by laboratory reports. Many patients with EM (clinically diagnostic of LB) are not recorded as cases as they are either seronegative due to the delay in a detectable antibody response, or they are not referred for laboratory confirmation.. The NLBTL is currently working with Health Protection Scotland to improve the data collated, which will now include the reporting all seronegative patients with EM, although mandatory reporting of all clinical cases, including those with EM, would provide the best estimate of the burden of LB in Scotland.

Conclusion:

The incidence of LB may be stabilising in Scotland but the Highlands remain an area of high incidence. As laboratory figures are likely to vastly underestimate the extent of the disease we feel that mandatory reporting of all clinical cases is required to give a more accurate understanding of the burden of LB in Scotland. Once this is determined the use of antibiotic prophylaxis and other preventative measures in the Highlands may need addressed.

