



Public Health  
England

Protecting and improving the nation's health

# **Leptospirosis Enhanced Surveillance Protocol**

Pilot study to improve the surveillance of laboratory-confirmed cases of leptospirosis

December 2016

# About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

Public Health England  
Wellington House  
133-155 Waterloo Road  
London SE1 8UG  
Tel: 020 7654 8000  
[www.gov.uk/phe](http://www.gov.uk/phe)  
Twitter: [@PHE\\_uk](https://twitter.com/PHE_uk)  
Facebook: [www.facebook.com/PublicHealthEngland](https://www.facebook.com/PublicHealthEngland)

Prepared by: Ebere Okereke, Kate Halsby, Colin Brown, Roberto Vivancos  
For queries relating to this document, please contact: Kate Halsby, Emerging Infections and Zoonoses Section, National Infection Service PHE Colindale, 0208 327 7818 or [zoonoses@phe.gov.uk](mailto:zoonoses@phe.gov.uk)

© Crown copyright 2016

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence, visit [OGL](https://www.ogil.io) or email [psi@nationalarchives.gsi.gov.uk](mailto:psi@nationalarchives.gsi.gov.uk). Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

Published December 2016  
PHE publications gateway number: 2016510



# Contents

About Public Health England	2
Purpose of this document	4
Background	4
UK Epidemiology and current surveillance systems	5
Co-ordination of surveillance activities	6
Workload implications	6
Methods	7
Case definition	7
Data collection	7
SOP for health protection teams	8
Analysis and interpretation of data and dissemination of reports	9
Evaluation of the pilot	9
Annex	10

# Purpose of this document

This document sets out the protocol for the surveillance of **confirmed** cases of leptospirosis in England.

This surveillance is a pilot-enhanced surveillance system aimed at improving our understanding of leptospirosis in the UK to enable further development of guidance and policy.

The pilot has been proposed to run for **six months** and will be evaluated and decisions made for long-term surveillance.

## 1.1 Background

Leptospirosis is a zoonotic disease caused by the spirochaete bacterium *Leptospira interrogans* of which only some strains are pathogenic. *L. Icterohaemorrhagiae* is the main serovar responsible for human disease. Leptospirosis is more common in tropical areas of the world, but also occurs throughout temperate areas and over one million infections are estimated to occur globally each year.

Humans mainly acquire infection by direct contact with the urine of chronically infected animals, particularly the brown rat *Rattus norvegicus*. Infection occurs when spirochaetes in urine, contaminated water or soil enter micro-abrasions in healthy intact skin, intact mucous membranes or conjunctiva. They may also cross the nasal mucosa and pass through the lungs (from inhalation of aerosolised animal body fluids). Individuals at increased risk include those working in the farming and water sports communities, with animal and water exposures. Person-to-person transmission is not known to occur.

Leptospirosis has changed over the years from being a predominantly occupational infection to one now more commonly associated with recreational activities. The risk of acquiring *Leptospira* infection is increased with exposure to inland surface waters both at home and abroad, especially involving water-based and adventure sports and where the risk of skin abrasions is high.

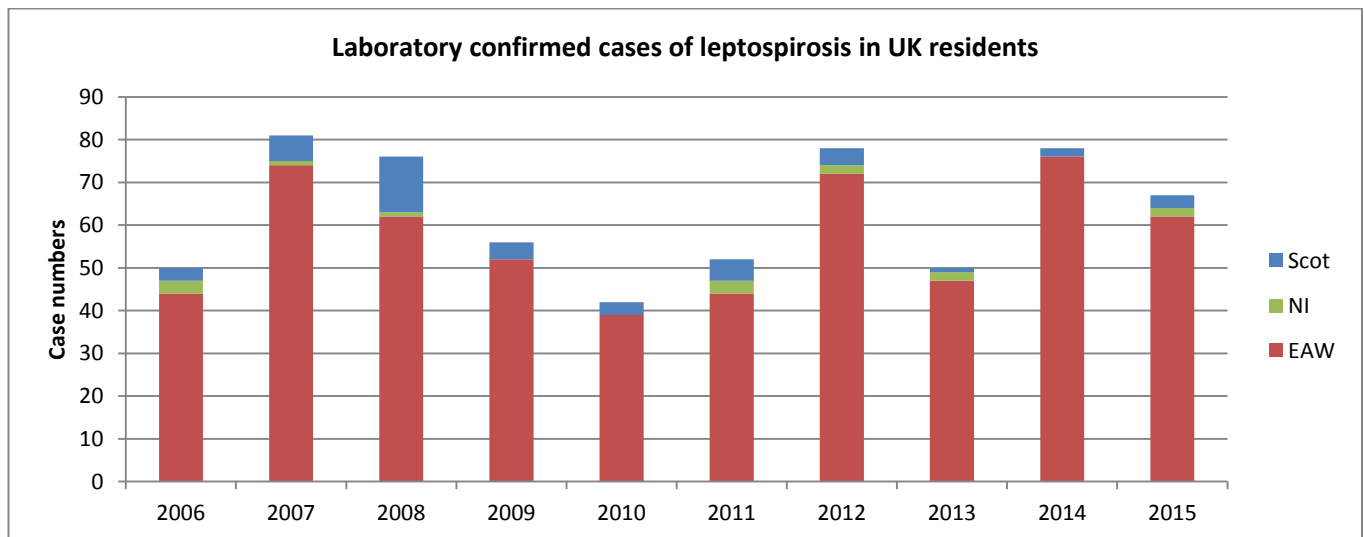
Occupational exposures still occur in those working with livestock or where there are exposures to rodents or their urine. In addition to sources such as livestock and wild rodents, cases have also been associated with pet rats.

## 1.2 UK Epidemiology and current surveillance systems

As leptospirosis is not statutorily notifiable in England, Wales and Scotland, it is reportable as a laboratory isolate and surveillance is based on laboratory reports. In Northern Ireland, it is notifiable in humans under public health legislation.

Our understanding of the epidemiology is incomplete due to the limited clinical and risk factor information provided on the reference laboratory request forms (see [annex 1](#)). In addition, laboratory diagnosis of leptospirosis is complex and requires multiple samples and clinical information to interpret the laboratory test results.

However, recent improvement in laboratory processes and partnership between the reference labs and the surveillance team has improved the identification of confirmed cases in real time. This therefore presents an opportunity to understand the epidemiology of leptospirosis in the country by undertaking enhanced surveillance.



## 1.3 Objectives

The objectives of the leptospirosis surveillance system are to:

- understand the clinical and epidemiological characteristics of laboratory-confirmed cases of leptospirosis
- obtain information on risk factors to inform development of public health advice
- provide information to improve laboratory diagnostics

The objectives of the pilot study are:

- to determine the feasibility of collecting epidemiological information on laboratory-confirmed cases of leptospirosis
- to determine the work load involved with obtaining additional clinical and epidemiological information on confirmed cases of leptospirosis

## 1.4 Co-ordination of surveillance activities

The Emerging Infections and Zoonoses section of the National Infection Service will lead the co-ordination of the surveillance system, including conducting epidemiological analysis and reports. Quarterly summary reports will be produced and disseminated through the quarterly zoonoses report in the Health Protection Report (HPR).

Health protection teams (HPTs) will have lead responsibility for obtaining surveillance activities information for confirmed cases and returning completed questionnaires to EIZ for analysis. The Field Epidemiology Service (FES) will assist by prompting and reminding HPTs to submit completed surveillance forms.

The laboratories that comprise the **National Leptospirosis Service** (Colindale and Porton) will be responsible for identifying confirmed cases and notifying the HPTs and EIZ.

## 1.5 Workload implications

The average number of cases of leptospirosis reported each year in England is low, fewer than 80 cases/year, except in an outbreak. In 2015, 62 cases of leptospirosis, confirmed by the reference laboratories, were reported in England and Wales. The region with the most cases in 2015 was the South West (n=17). Thus the average number of cases per PHE centre is less than 10. See table 1 below.

**Table 1: Confirmed leptospirosis cases by PHEC, Q1 –Q4, 2015**

PHE centre	Q1	Q2	Q3	Q4	Total
East Midlands				3	3
East of England	1		3	3	7
London	1		5	4	10
North East		1			1
North West		1	1	5	7
South East	1	1	1	1	4
South West	5	2	4	6	17
Wales				2	2
West Midlands			1		1
Y&H		1	6	4	11
<b>Total</b>	<b>8</b>	<b>6</b>	<b>21</b>	<b>28</b>	<b>63</b>

However, it is recognised that there is often some delay between presentation and diagnosis, so patients may have been discharged before the diagnosis is confirmed and HPTs alerted. It will therefore be necessary to contact GPs or clinicians to obtain some epidemiological information. The pilot study will determine how challenging this might be to inform any longer-term surveillance plans.

# Methods

## 2.1 Case definition

This surveillance is based only on **laboratory-confirmed** cases. The diagnostic methods on which this surveillance system will be based are immunological and genomic methods, as direct identification of leptospirosis is difficult.

A case of leptospirosis for surveillance will be confirmed by the PHE reference laboratories as follows:

**Microscopic Agglutination Test (MAT): Confirmed case**

- a **single MAT titre of  $\geq 320$**
- a **rising MAT titre**, rising to 320
- any **four fold rise** in MAT titre

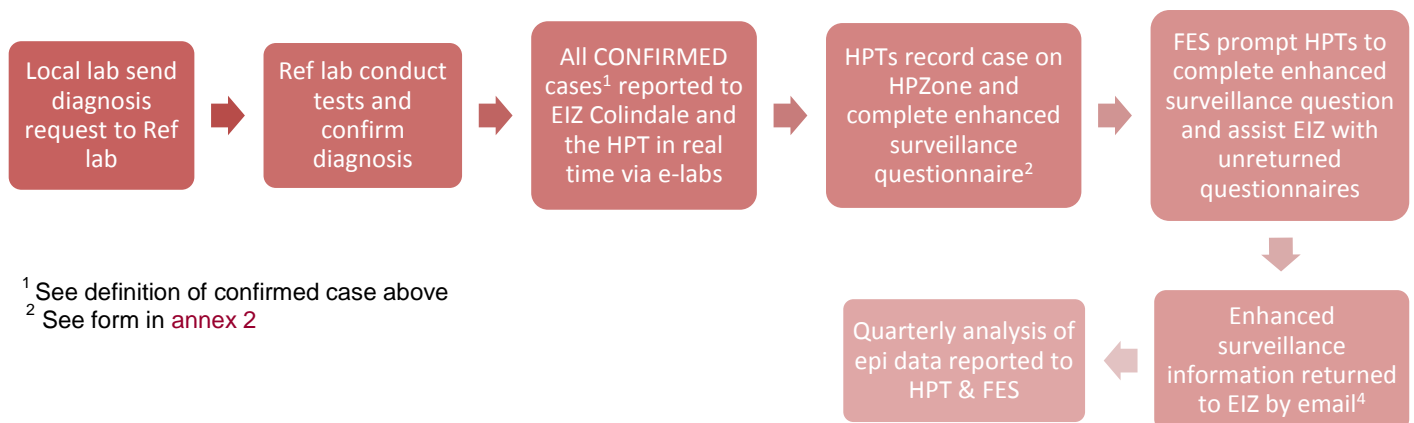
**PCR: Confirmed case**

- 16S rRNA PCR positive on any sample

The final status of a case of leptospirosis as confirmed and therefore for inclusion in the surveillance system will be designated by a clinical microbiologist in the National Leptospirosis Service.

## 2.2 Data collection

**REF LAB → EIZ CIDSC & HPT (via e-lab) → EIZ CIDSC (FES act as local facilitator)**



<sup>1</sup> See definition of confirmed case above

<sup>2</sup> See form in [annex 2](#)

## 2.3 SOP for health protection teams

	Action	Responsible personnel	Comment
1	Diagnosis confirmed. Final case status assigned on lab system (MOLIS) (Selecting the final case status is required to trigger report sharing with HPT)	Duty clinical microbiologist, Colindale ref lab	
2	<ul style="list-style-type: none"> <li>lab report sent to HPT (based on postcode provided or source lab). Lab report will include weblink to enhanced surveillance questionnaire on select survey</li> <li>copy report sent to EIZ in Colindale</li> </ul>	MOLIS database manager (this will be automated)	Weblink will be to a select survey questionnaire, but the option to have a printable word document questionnaire is also available
3	Receiving HPT to forward e-lab report to appropriate HPT of residence for action	HPT (Information officer / Acute service desk)	HPT of source lab may not be HPT of case resident.
4	HPT to create a case record on HPZone (if not already on HPZone)	HPT	Case should be Leptospirosis confirmed. Unless species is indicated on e-lab report, select <i>Lepstospira spp.</i>
5	HPT to determine location and status of patient (still in hospital? Deceased?)	HPT	Contact hospital or GP
6	Complete enhanced surveillance questionnaire either directly with patient or next of kin	HPT	The questionnaire is designed for telephone or face-face administration by a professional, not for self-completion by patient
7	<ul style="list-style-type: none"> <li>upload copy of completed questionnaire to HPZone record.</li> <li>HPTs should consider setting a local HPZone action to remind them to return completed questionnaire</li> <li>submit questionnaire via select survey</li> <li>if the word document version is used, then email or fax completed questionnaire to EIZ within 2 weeks of notification of results</li> </ul>	HPT	Email address <a href="mailto:zoonoses@phe.gov.uk">zoonoses@phe.gov.uk</a> Secure fax no: 0208 905 9929
8	EIZ epi scientist to notify FES zoonoses lead of any outstanding questionnaires, every 4 weeks	EIZ	4 weeks after the result sent to e-lab.
9	FES to prompt HPTs to ensure questionnaire completed and returned	FES	
10	Completed enhanced surveillance questionnaires uploaded into leptospirosis database	EIZ	Any links indicating possible clusters / outbreaks identified will be notified to HPTs
11	Quarterly analysis report produced and disseminated	EIZ	Via HPR and through Centre & FES zoonoses leads
12	Final analysis and evaluation of pilot enhanced surveillance reported and shared	EIZ / FES	



## 2.4 Analysis and interpretation of data and dissemination of reports

EIZ will be responsible for providing analysis of the data and will flag up any changes in epidemiology identified from the surveillance system.

The analysis will be reported through the quarterly zoonoses report disseminated through the weekly HPR. The analysis will include:

- number of confirmed cases of leptospirosis in England and Wales by sex, age group and PHE centre of residence
- clinical presentation and outcome
- exposures / risk factors

## 2.5 Evaluation of the pilot

The pilot-enhanced surveillance system will run for six months. At the end of this period, the surveillance system will be evaluated to determine the value to improved understanding of the epidemiology of leptospirosis in England and Wales and the workload implications of the process. A recommendation will then be made about long-term options for leptospirosis surveillance.

# Annex

## Annex 1: Leptospirosis laboratory request form

**P3** PHE Microbiology request form

**Public Health England**  
Please write clearly in dark ink

**Leptospirosis Request**  
Rare and Imported Pathogens Laboratory

**PHE Microbiology Services**  
Porton Down, Salisbury  
Wiltshire SP4 0JG

Phone +44 (0)1980 612348 (9am - 5pm)  
Phone +44 (0)1980 612100 (oncall)  
Email [ripl@phe.gov.uk](mailto:ripl@phe.gov.uk)  
[www.gov.uk/phe](http://www.gov.uk/phe)

PHE  
DX 6930400  
Salisbury SP2 9P

---

**SENDER'S INFORMATION**

Sender's name and address \_\_\_\_\_

Postcode \_\_\_\_\_

**Report to be sent FAO**

Direct Phone \_\_\_\_\_

Direct Phone (out of hours) \_\_\_\_\_

Purchase order number \_\_\_\_\_

Project code \_\_\_\_\_

---

**PATIENT/SOURCE INFORMATION**

Human  Animal\*  Other\* \*Please specify \_\_\_\_\_

Inpatient  Outpatient  GP Patient  Other\* \*Please specify \_\_\_\_\_

NHS number \_\_\_\_\_

Gender:  male  female

Surname \_\_\_\_\_ Date of birth \_\_\_\_\_ Age \_\_\_\_\_

Forename \_\_\_\_\_ Patient's postcode \_\_\_\_\_

Hospital number \_\_\_\_\_ Patient's HPT \_\_\_\_\_

Hospital name (if different from sender's name) \_\_\_\_\_ Ward:  ITU  Dialysis Other ward/clinic \_\_\_\_\_

Have previous samples been sent to RIPL  Yes  No RIPL Lab ref. no. P1 \_ CO \_ \_ \_ \_ \_

Pregnant  Yes  No  Unknown

---

**SAMPLE INFORMATION**

Sample type	Your reference
<input type="checkbox"/> Serum/clotted blood	_____
<input type="checkbox"/> EDTA Plasma	_____
<input type="checkbox"/> CSF	_____
<input type="checkbox"/> Urine (only send with paired sera)	_____
<input type="checkbox"/> Blood Culture	_____
<input type="checkbox"/> Other (please specify)	_____

Date of collection \_\_\_\_\_ Time \_\_\_\_\_

Date sent to RIPL \_\_\_\_\_

To discuss any patient with undiagnosed fever following recent travel abroad the Infectious Diseases, Microbiology or Virology doctor should call the Imported Fever Service on

**0844 77 88 990**

Note: If infection with a Hazard Group 4 pathogen is suspected from clinical information or travel history, you must contact this number before sending.

Please tick the box if your clinical sample is post mortem

---

**TESTS REQUESTED**

RIPL will select the most appropriate Leptospirosis and Hantavirus tests based on information provided below (i.e. travel and clinical details)  
Refer to our user manual for further details

Leptospirosis PCR will be performed on all Sera/Plasma samples within 7 days post onset and on all urine samples paired with sera

OMIT HANTAVIRUS TESTS

---

**CLINICAL/EPIDEMIOLOGICAL INFORMATION**

Foreign Travel within previous 21 days?  Yes  No

Purpose of travel \_\_\_\_\_

Date of travel (from UK) \_\_\_\_\_

Date returned (to UK) \_\_\_\_\_

Onset date \_\_\_\_\_

Countries/areas visited \_\_\_\_\_

Water contact\*  Animal contact\* \*Please specify \_\_\_\_\_

Relevant Occupational History \_\_\_\_\_

Asymptomatic

Fever

Headache

Flu-like illness

Myalgia

Malaise

Diarrhoea

Vomiting

Abnormal liver function

Hepatic failure

Jaundice

Abnormal renal function

Renal replacement therapy required

Thrombocytopenia

Meningitis

Other clinical details \_\_\_\_\_

Antimicrobials given? \_\_\_\_\_

---

**REFERRED BY**

Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

All requests are subject to PHE standard terms and conditions.

version effective from Jan. 2015 SP4HWD198.01

**Annex 2**



Public Health  
England

**PILOT LEPTOSPIROSIS EPIDEMIOLOGICAL SURVEILLANCE**  
 PHE Emerging Infections and Zoonoses Section, National Infection Service  
 61 Colindale Avenue, London NW9 5EQ.  
 Tel: 020 8327 7818 Secure Fax: 020 8905 9929  
 Email: [zoonoses@phe.gov.uk](mailto:zoonoses@phe.gov.uk)

**Patient Details**

SURNAME: \_\_\_\_\_ FORENAME: \_\_\_\_\_  
 D.O.B.: (DD/MM/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_ GENDER:  MALE  FEMALE  
 NHS NUMBER: \_\_\_\_\_ POSTCODE OF RESIDENCE \_\_\_\_\_  
 HPZONE NO: \_\_\_\_\_ PHE CENTRE: \_\_\_\_\_

**PART A: Clinical presentation**

1) Onset date: (DD/MM/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_  
 2) Date of first presentation (if onset date unknown DD/MM/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_  
 3) Hospitalised?  Yes  No  Unknown  
 4) Was the clinical presentation severe?  Yes  No  
*(Severe includes: admission to ICU/HDU, stage 3 or 4 renal failure, HUS, renal dialysis or other renal replacement therapy, hepatic failure, meningitis, pulmonary haemorrhage, DIC, multi-organ failure, shock)*  
 5) Did the patient have pre-existing on-going immune-suppression of any cause?  Yes  No  
 Unknown

Please comment: \_\_\_\_\_

**PART B: Outcome**

6) What was the outcome?  
 Recovered  Still Hospitalised / Recovering  Died  Unknown  
 Prolonged clinical complications. Comment:

**PART C: Travel History**

7) Has the patient recently travelled **WITHIN** the UK, (returning in the last 30 days before onset)?  
 Yes  No  Unknown **If yes, please provide the following details:**

Country visited	Dates (DD/MM/YYYY)		Comment
	From	To	

8) Has the patient recently travelled **OUTSIDE** the UK (returning in the last 30 days before onset)?  
 Yes  No  Unknown **If yes, please provide the following details:**

COUNTRY visited	Dates (DD/MM/YYYY)		Comment
	From	To	

**PART D: Risk activities / exposures**

**9) At the time of onset, did the patient participate in any of the following activities associated with risk of Leptospirosis?**

**Occupational exposure:**

Occupation	In the UK	Abroad	Comment / Detail
Working in rivers / floodwater or other surface water	<input type="checkbox"/>	<input type="checkbox"/>	
Sewage worker	<input type="checkbox"/>	<input type="checkbox"/>	
Refuse collection	<input type="checkbox"/>	<input type="checkbox"/>	
Park worker	<input type="checkbox"/>	<input type="checkbox"/>	
Pest control	<input type="checkbox"/>	<input type="checkbox"/>	
Agricultural worker	<input type="checkbox"/>	<input type="checkbox"/>	
Abattoir worker	<input type="checkbox"/>	<input type="checkbox"/>	
Veterinary staff	<input type="checkbox"/>	<input type="checkbox"/>	
Laboratory worker	<input type="checkbox"/>	<input type="checkbox"/>	
Pet shop worker	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	

**Animal contact:**

Animal	In the UK	Abroad	Comment / Detail
Dog	<input type="checkbox"/>	<input type="checkbox"/>	
Cat	<input type="checkbox"/>	<input type="checkbox"/>	
Pet rodent	<input type="checkbox"/>	<input type="checkbox"/>	
Wild rodent	<input type="checkbox"/>	<input type="checkbox"/>	
Cattle	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	

**Water activities (fresh / surface water, not including occupational exposures):**

Activity / exposure	In the UK	Abroad	Comment / Detail
Swimming in treated water (eg indoor / outdoor pool)	<input type="checkbox"/>	<input type="checkbox"/>	
Swimming in untreated water (eg rivers, streams etc)	<input type="checkbox"/>	<input type="checkbox"/>	
Canoeing	<input type="checkbox"/>	<input type="checkbox"/>	
Fishing	<input type="checkbox"/>	<input type="checkbox"/>	
Potholing / Caving	<input type="checkbox"/>	<input type="checkbox"/>	
Wading in surface water	<input type="checkbox"/>	<input type="checkbox"/>	
White water rafting	<input type="checkbox"/>	<input type="checkbox"/>	
Triathlon / Iron man	<input type="checkbox"/>	<input type="checkbox"/>	
Other water sports .....	<input type="checkbox"/>	<input type="checkbox"/>	

10) Most likely date of exposure, if known (DD/MM/YYYY)? \_\_\_\_/\_\_\_\_/\_\_\_\_

**PART E: Please provide any further comment**

.....

.....

.....

.....

Date completed: _____ / _____ / _____	
Completed by:	Contact phone no:
HPT:	PHE Centre:

*Thank you for your time and assistance.*