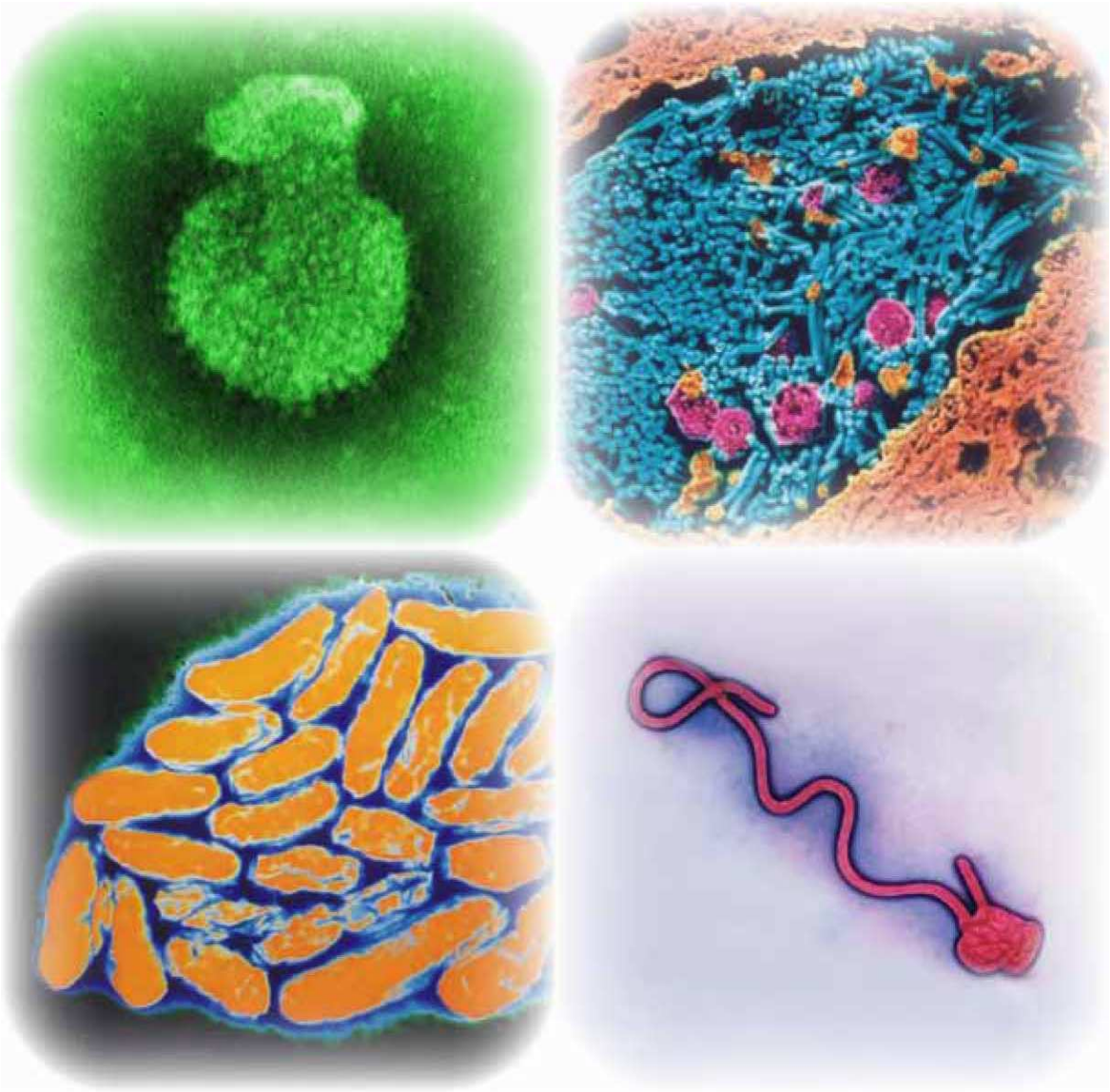
Public Health England

Rare and Imported Pathogens Laboratory (RIPL)

PHE Microbiology Services Porton

Specimen Referral Guidelines and Service User Manual

April 2014 version 11, QPulse SPATH039



CPA
Accredited Medical Laboratory
Reference No: 1612

Certificate No. FS 33819

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Front cover: illustrations clockwise from top left: Lassa virus, Anthrax in Lung, Ebola virus, ‘Q’ Fever.

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1. General Information

1.1. RIPL history

The Rare and Imported Pathogens Laboratory (RIPL) is now incorporated into the functions of Public Health England (PHE), which was established on 1st April 2013. Previously RIPL operated within HPA Microbiology Services Porton and was known until Nov 2011 as the Special Pathogens Reference Unit (SPRU). From 2005 to 2009, SPRU operated as part of the Novel and Dangerous Pathogens Department at the Health Protection Agency (HPA) Centre for Emergency Preparedness and Response (CEPR), then later as part of the Medical Affairs department. RIPL now operates as part of the Specialist Microbiology Services subdivision of PHE Microbiology Services.

RIPL provides a clinical diagnostic service for rare and/or imported pathogens such as pathogenic arboviruses, haemorrhagic fever viruses and a number of Hazard Group 3 bacterial pathogens including rickettsiae, *Coxiella burnetii* and *Bacillus anthracis*.

RIPL is the front-line laboratory providing diagnostics for the Imported Fever Service following its inception in June 2012.

RIPL also provides an environmental detection service for investigation and identification of anthrax.

The Lyme disease testing service was transferred from HPA Southampton to RIPL on 1st June 2012. See Appendix 1 for details.

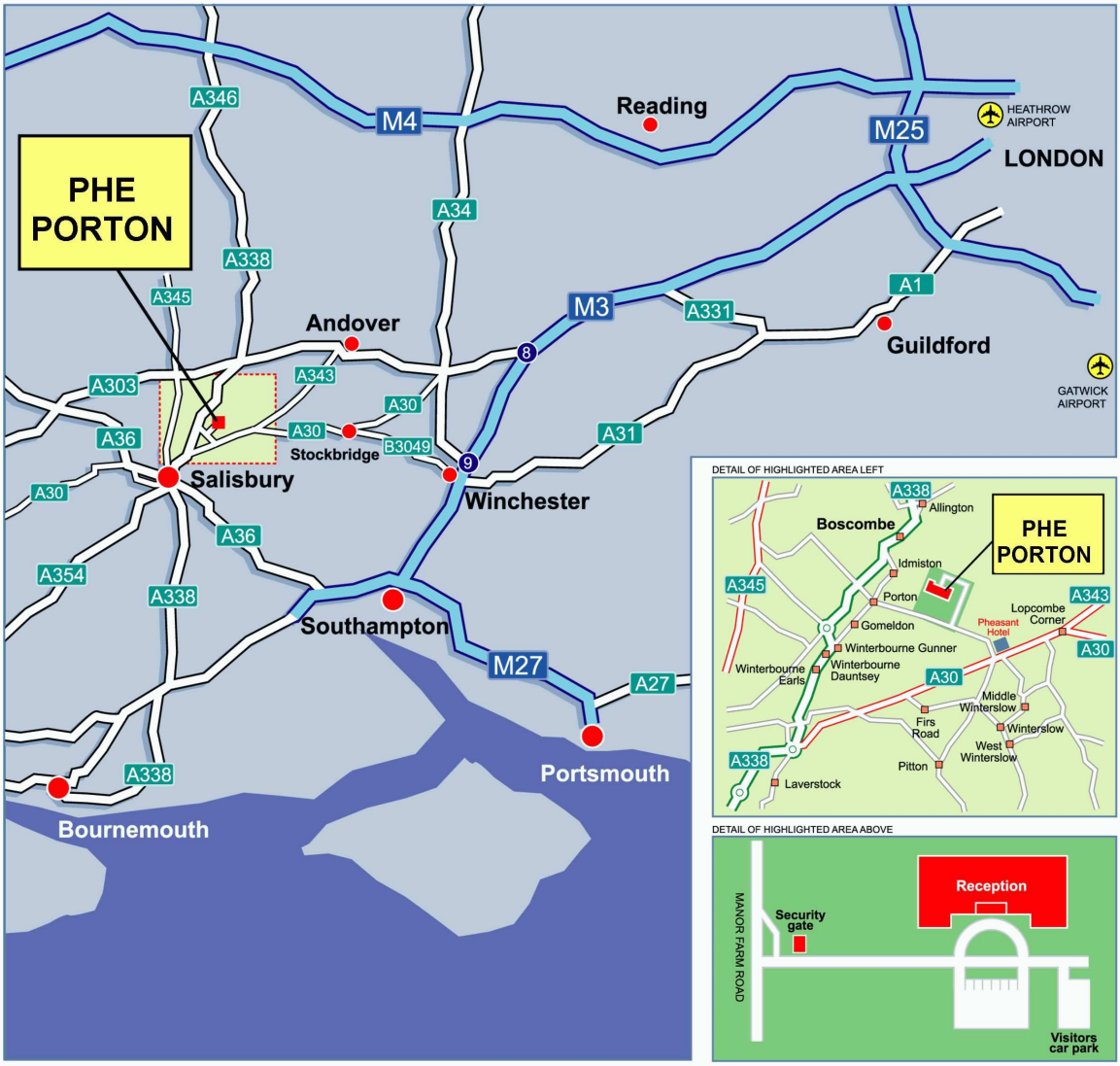
1.2. Population served

RIPL provides specialist expertise and advice to Public Health England, the National Health Service, other Government Departments, the commercial sector, and to clinical, veterinary and environmental services throughout the UK, Europe and elsewhere in the world. RIPL is the core component of the WHO Collaborating Centre for Virus Reference and Research (Special Pathogens) at Porton Down.

1.3. Contact details & where to find RIPL

Address:	Rare and Imported Pathogens Laboratory Public Health England, Porton Down, Salisbury, Wiltshire, SP4 OJG United Kingdom
DX address	DX 6930400 Salisbury92/SP
Telephone:	09:00 to 17:00, weekdays Direct: +44 (0)1980 612348 Out-of-hours Porton Reception: +44 (0)1980 612100
Fax:	+44 (0)1980 612695
E-mail:	ripl@phe.gov.uk (checked on weekdays only)
Web:	https://www.gov.uk/phe

Sat Nav users: Specify Manor Farm Road, Porton Down rather than the postcode to avoid being directed to the wrong entrance.



1.4. Research

The laboratory and associated research groups included in the WHO collaborating centre undertake a wide range of research activities. This ranges from investigation of clinical isolates from specific cases and outbreaks by isolation, phenotypic and genotypic characterisation through to assessment and development of new diagnostic tests and platforms for use within the conventional and field laboratory. Research also includes development and assessment of interventions in models of infection. We also welcome participation in prospective and retrospective clinical studies, serosurveillance and disease prevalence studies as well as therapeutic studies for a wide range of potential pathogens with partners worldwide. As a centre with extensive capability in this area there is an extensive training programme and testing of new techniques for improved working practices at CL3 and CL4.

1.5. Personnel and contact details

Name	Designation	Email ID	Telephone
Dr Tim Brooks	Consultant Microbiologist, Clinical Services Director, RIPL	tim.brooks@phe.gov.uk	01980 612348
Dr Emma Aarons	Consultant Virologist	emma.aarons@phe.gov.uk	01980 612348
Dr Andrew Simpson	Consultant Microbiologist	andrew.simpson@phe.gov.uk	01980 612348
Dr Matthew Dryden	Consultant Microbiologist	matthew.dryden@phe.gov.uk	01980 612348 (Mondays and Tuesdays only)
Dr M Sudhanva	Hon. Consultant Virologist	m.sudhanva@phe.gov.uk msudhanva@nhs.net	01980 612348 (Mondays only)
Dr Jane Osborne	Clinical Scientist	jane.osborne@phe.gov.uk	01980 612348
Dr Richard Vipond	General Project Manager	richard.vipond@phe.gov.uk	01980 612430
Sheila Holt	Training Officer/Acting Quality Manager	sheila.holt@phe.gov.uk	01980 612866

1.6. Laboratory opening times

Normal working hours: 09:00 to 17:00 Monday – Friday

Note that in order to arrange urgent testing outside these normal working hours, it will be necessary to discuss the clinical case with the RIPL on-call Medical Consultant; see Section 2.6.

2. Use of the laboratory

2.1. Diagnosing a rare or imported pathogen

The presentation of most imported diseases is very similar, and it can be very difficult clinically to distinguish between them. Co-infections with more than one agent are also relatively common. For this reason, we offer panels of tests based upon the patient's symptoms and travel history that include the commonest differential diagnoses (see Section 2.2 below). The charge for this is more than for a single assay, but significantly less than two separate tests. Unless you have a specific reason for testing for a single agent, or are very familiar with current disease prevalence, we suggest that you provide as many clinical and travel details as possible and allow us to select the appropriate panel of tests. Unless specified otherwise on the Request Form, an appropriate test panel will be run on all samples.

Panels include both serology and PCR as required, with PCR tests being offered as well as serological tests for acute cases or specific problems. PCR tests are not normally performed for long term conditions except Q fever, as they would not be positive and diagnosis relies on serology.

Arboviruses and rickettsiae are causes of febrile illness in travellers returning to the United Kingdom from many areas. Less frequently, illness caused by viral haemorrhagic fevers may have to be considered. Although not common, Q fever, anthrax, plague and other bacterial infections, derived either from within the UK or abroad, may also be considered as part of the differential diagnosis.

When asking for a test, consider the geographical location that the patient has returned from (Section 2.2), and the timing of their visit. The table of typical incubation periods shown below (Section 2.3) may help clarify whether a particular disease could be involved.

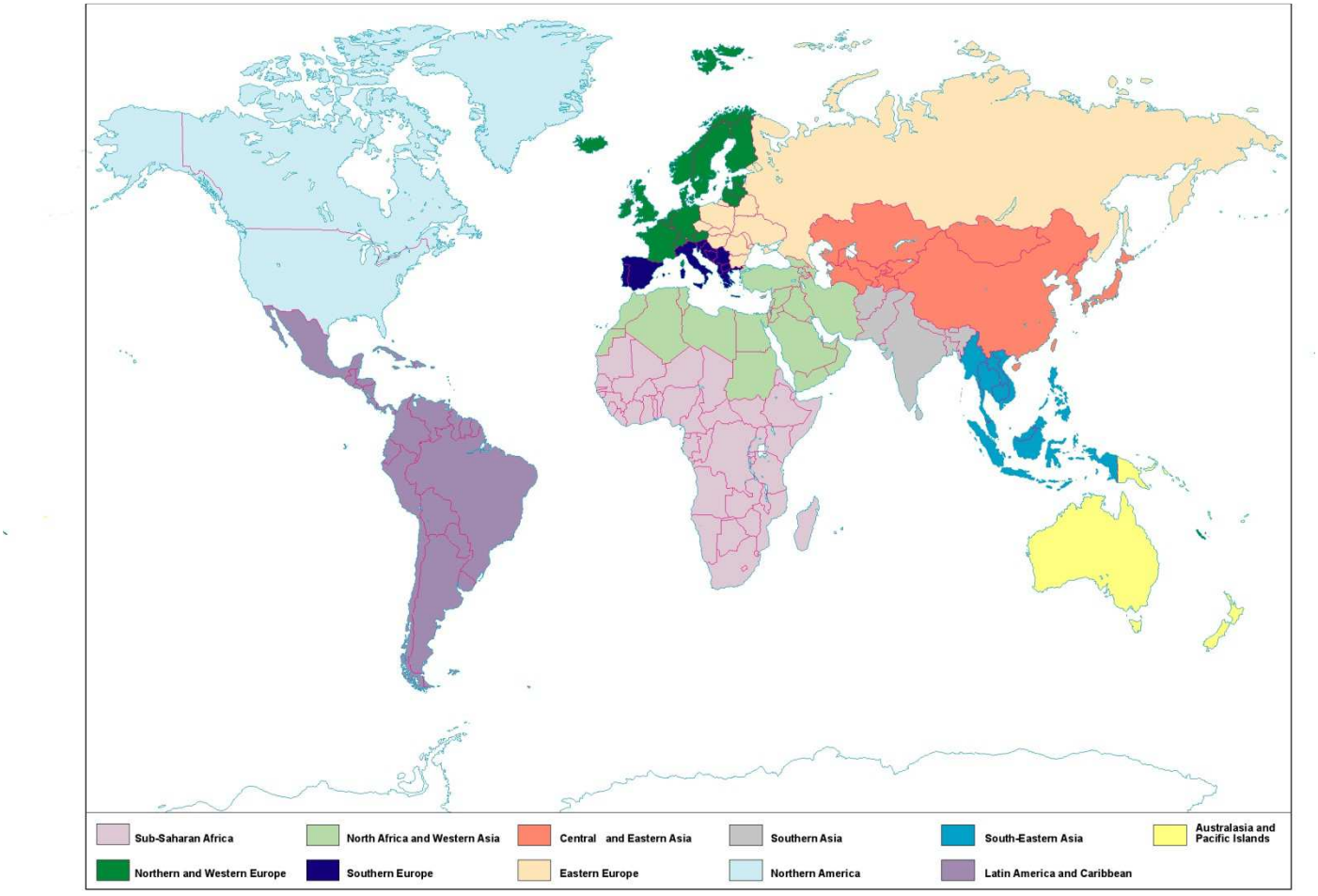
Common conditions such as malaria or enteric fever (typhoid) must not be forgotten and should be screened for, alongside more exotic diseases, as prompt treatment may be life-saving.

Additional tests may be available other than those listed for special cases. Please telephone to discuss (01980 612348 during working hours).

For Lyme disease testing please see Appendix 1.

2.2. Map of regions

Routine tests are run in regional and symptomatic panels. Additional tests are added if the clinical details justify them, or by discussion with the referring physicians. The map below shows the main geographic groupings we use; the incidence of diseases is not constant across any given region and we welcome additional information that could help us offer a better service.



Map produced by PC Graphics (UK) Limited

Please see notes below on Viral Haemorrhagic Fevers (Section 2.4) for additional information.

Our list of available tests (Section 2.16) is continuously updated and we may be able to offer additional assays on request.

2.3. Typical incubation periods

Short <10 days	Medium 10-21 days	Long >21 days
Arboviruses	Malaria	Viral hepatitis
Enteric bacteria	Enteric fever (typhoid)	Malaria
Haemorrhagic fevers	Scrub Typhus	Tuberculosis
Typhus & Spotted fevers	Brucellosis	HIV
Plague	Leptospirosis	Filariasis

2.4. Risks of viral haemorrhagic fevers in different countries

	Countries where outbreaks have occurred	Countries with evidence of endemicity, through sporadic cases or seroprevalence studies	Countries/areas with a theoretical risk based on geography but no reports of cases
Ebola and Marburg	**Angola, Congo, DRC, Gabon, Guinea, Ivory Coast, Kenya, Liberia, South Sudan, Sudan, Uganda**	**Zimbabwe**	**Central and West African countries**
CCHF	**Afghanistan, Bulgaria, China, Iraq, Iran, Kazakhstan, Kosovo, Mauritania, Pakistan, Russia, South Africa, Tajikistan, Turkey, UAE, Uganda, Uzbekistan.**	**Benin, Burkina Faso, DRC, Egypt, France, Greece, Hungary, India, Kenya, Oman, Portugal, Tanzania.**	**Africa, Balkans, Central Asia, Eastern Europe, Middle East.**
Lassa	**Guinea, Liberia, Nigeria, Sierra Leone.**	**Benin, Burkina Faso, Ghana, Ivory Coast, Mali, Togo**	**Cameroon, Central African Republic, other West African countries.**
Lujo	**South Africa**	**Zambia**	

Note: The following viruses also have the potential to cause haemorrhagic symptoms: hantaviruses, chikungunya virus, Rift Valley fever virus, dengue viruses and yellow fever virus.

(Refer to Advisory Committee on Dangerous Pathogens (ACDP) Guidelines: 'Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence')

2.5. Pathogens for which testing is currently available at RIPL

VIRUSES

Virus family	Genus	Species
Filoviridae	**Marburgvirus**	Marburg virus
	Ebolavirus	Ebola virus group (e.g. Zaire, Sudan)
Arenaviridae	**Arenavirus**	New World arenaviruses –Junin, Guanarito, Chapare virus *
		Lassa virus
		Lymphocytic Choriomeningitis virus* (LCMV)
Bunyaviridae	**Nairovirus**	Crimean-Congo Haemorrhagic fever virus* (CCHF)
	Hantavirus	Hantaan virus*
		Seoul virus*
		Dobrava virus*
		Puumala virus*
		Saaremaa virus*
		Sin Nombre virus*
	Phlebovirus	Rift valley fever virus
		Sandfly fever virus group – Toscana virus
		Sandfly fever virus group – Sicilian, Cyprus and Naples virus
	Orthobunyavirus	California encephalitis group*
Flaviviridae	**Flavivirus**	Dengue virus
		Japanese encephalitis virus
		Kunjin virus*
		Murray Valley encephalitis virus
		St Louis encephalitis virus
		Tick-borne encephalitis virus group
		West Nile virus
		Yellow fever virus
		Zika virus*
Togaviridae	**Alphavirus**	Chikungunya virus
		Mayaro virus
		Ross River virus
		Sindbis virus
		Eastern equine encephalitis virus
		Western equine encephalitis virus
		Venezuelan equine encephalitis virus
Paramyxoviridae	**Henipavirus**	Hendra virus
		Nipah virus
Poxviridae	**Orthopox virus**	Variola virus (smallpox)*
		Monkeypox virus*
		Cowpox virus*
		Vaccinia virus*
		Buffalopox virus*
	Parapox virus	Orf virus*

*The tests for these pathogens *comprise or include* developmental assays for which there has been limited technical validation data and which may not be performed routinely/regularly. For additional tests please discuss with the medical team on 01980 612348.

BACTERIA

Genus	Species	Disease
Anaplasma	*A. phagocytophilum*	Anaplasmosis
Bacillus	*Bacillus anthracis*	Anthrax
Borrelia	*Borrelia burgdorferi s.l.*	Lyme disease
Brucella	*Brucella* spp*	Brucellosis
Burkholderia	*B. pseudomallei**	Melioidosis
	*B. mallei**	Glanders
Coxiella	*Coxiella burnetii**	Q fever
Francisella	*Francisella tularensis*	Tularaemia
Leptospira	*Leptospira* spp.*	Leptospirosis
Orientia	*Orientia tsutsugamushi*	Scrub typhus
Rickettsial Epidemic Typhus group	*R. prowazekii*	Murine typhus, endemic typhus
	R. typhi	Epidemic typhus
Rickettsial Spotted Fever group	*R. rickettsii* (New World)	Rocky Mountain Spotted fever
	R. conorii (Old World)	Mediterranean Spotted fever
	R. africae	African tick bite fever
	R. sibirica	Siberian tick typhus
	R. australis	Australian tick typhus
	R. akari	Rickettsial pox
Yersinia	*Yersinia pestis*	Plague

* The tests for these pathogens *comprise or include* developmental assays for which there has been limited technical validation data and which may not be performed routinely/regularly.

For additional tests please discuss with the medical team on 01980 612 348.

2.6. Requesting procedure (routine, urgent and out of hours)

Routine – use the request form made available to your microbiology / virology laboratory in a CD form. Alternatively, use the online request form on the PHE RIPL website (see section 2.8).

Urgent during working day – please telephone the UK Imported Fever Service number 0844 77 88 99 0 or, if this is inappropriate (i.e. not an *imported* fever case), please telephone 01980 612 348 with all the clinical details so that the approximate arrival time of the specimen can be discussed.

Out-of-hours testing is based on discussions with the RIPL on-call Medical Consultant available via the UK Imported Fever Service number 0844 77 88 99 0 or, if this is inappropriate (i.e. not an imported fever case), PHE Porton Reception on 01980 612 100.

2.7. Requesting additional tests

Please telephone 01980 612 348 during working hours to request additional tests and provide any additional information available.

2.8. Completing the request form

The request form is available to download from the PHE RIPL website:

http://www.hpa.org.uk/ProductsServices/MicrobiologyPathology/LaboratoriesAndReferenceFacilities/RareAndImportedPathogensDepartment/

Most importantly, the mobile number or the direct telephone number of the microbiology or virology team should be included in the request form so that any significant result can be communicated promptly by the RIPL team.

Requests submitted must include the following patient demographics.

PATIENT/SOURCE INFORMATION

☐ Human ☐ Animal* ☐ Other* *Please specify

☐ Inpatient ☐ Outpatient ☐ GP Patient ☐ Other* *Please specify

NHS number	Gender ☐ male ☐ female
Surname	Date of birth D D M M Y Y Y Y Age
Forename	Patient's postcode
	Patient's HPT
Hospital number	☐ ITU or Other ward/clinic
Hospital name *(if different from sender's name)*	Pregnant ☐ Yes ☐ No ☐ Unknown
Have previous samples been sent to RIPL ☐ Yes ☐ No	RIPL Lab ref. no P1 _ CO _ _ _ _ _ _

In general, it is difficult to clinically diagnose all imported viral and rickettsial infections without laboratory generated evidence.

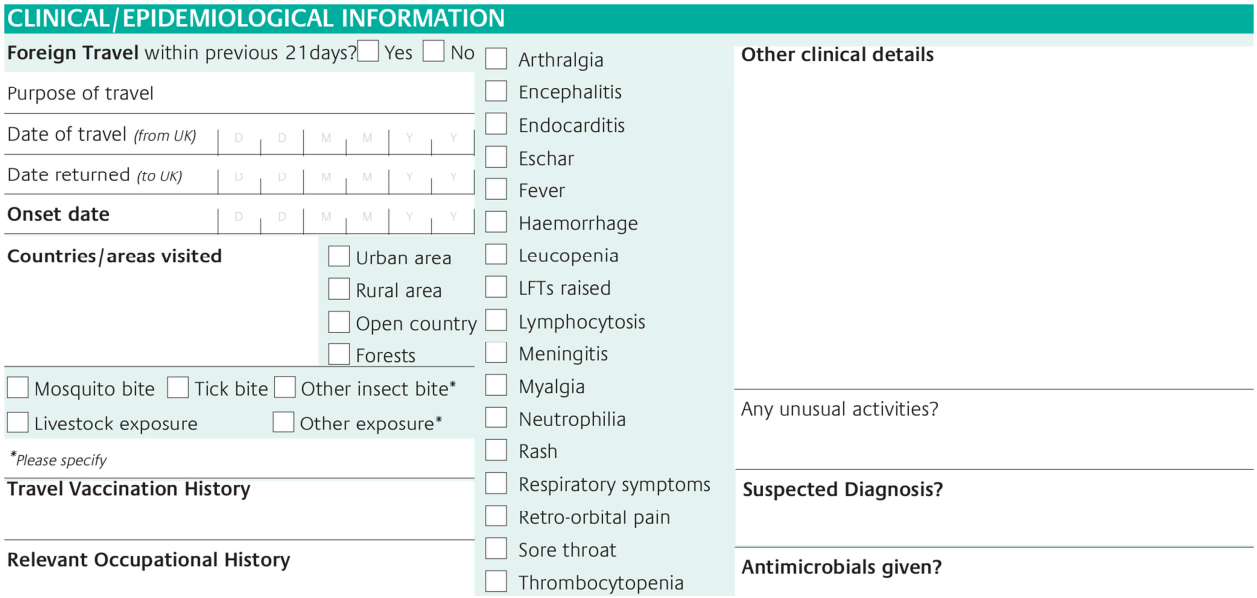
It is important that travel history and clinical details are given to let the RIPL team decide on the correct set of tests for the region of travel. As discussed above in Section 2.1, unless you have a specific reason for testing for a single agent, or are very familiar with current disease prevalence, we suggest that you provide as many clinical details as possible and allow us to select the appropriate panel of tests.

TESTS REQUESTED

RIPL will select the most appropriate panel of tests based on information provided below (i.e. travel and clinical details and suspected diagnosis).
To opt out of this approach, tick the box and state test(s) required.

☐ Limit testing to the test(s) specified here ONLY

The request form should include the following clinical and epidemiological information.



CLINICAL/EPIDEMIOLOGICAL INFORMATION

Foreign Travel within previous 21days? ☐ Yes ☐ No

Purpose of travel

Date of travel *(from UK)* D D M M Y Y

Date returned *(to UK)* D D M M Y Y

Onset date D D M M Y Y

Countries/areas visited

☐ Urban area
☐ Rural area
☐ Open country
☐ Forests

☐ Mosquito bite ☐ Tick bite ☐ Other insect bite*
☐ Livestock exposure ☐ Other exposure*

*Please specify

Travel Vaccination History

Relevant Occupational History

☐ Arthralgia
☐ Encephalitis
☐ Endocarditis
☐ Eschar
☐ Fever
☐ Haemorrhage
☐ Leucopenia
☐ LFTs raised
☐ Lymphocytosis
☐ Meningitis
☐ Myalgia
☐ Neutrophilia
☐ Rash
☐ Respiratory symptoms
☐ Retro-orbital pain
☐ Sore throat
☐ Thrombocytopenia

Other clinical details

Any unusual activities?

Suspected Diagnosis?

Antimicrobials given?

Information on antibiotic treatment should accompany requests for rickettsial and bacterial studies.

There is a separate form for Borrelia (Lyme disease) testing. Please see http://www.hpa.org.uk/ProductsServices/MicrobiologyPathology/LaboratoriesAndReferenceFacilities/LymeBorreliosisUnit/.

2.9. Specimen labelling

Use printed labels wherever possible. The specimen must be labelled with the same patient details as on the request form. Please ensure the full patient name, and the date of sample collection, are legible. Please note that unlabelled specimens do not guarantee authenticity of the sample; these cannot be processed and may be discarded.

2.10. Types of specimens and specimen collection methods

Serum
1 tube of serum for serology tests, minimum 500 µl volume. Occasionally less than this volume will be acceptable if it is difficult to obtain enough blood. Discuss with the laboratory if necessary.
Whole (unseparated) blood samples:
1 tube (approximately 4.5 ml) EDTA blood for PCR assays. Where possible, whole blood samples should not be sent over a weekend. Samples over three days old may not be suitable for testing if blood is lysed.

Tissue samples:
Tissue samples received for PCR testing should be received unhomogenised and frozen (or fixed). Samples received at room temperature may give rise to unreliable results, particularly for RNA viruses. Please note that fixed samples are more difficult to process by nucleic acid extraction procedures and may give false negative results.
Urine
Urine sent in a sterile universal container may be useful for Lassa virus and CCHF virus diagnosis. Ideally, a minimum of 5 ml of urine should be sent for testing.
CSF
Any CSF is accepted.
Throat swabs
Throat swabs for Lassa virus diagnosis should be transported in viral transport media. Please check that swabs are appropriate for viral not bacterial diagnosis. Charcoal swabs are not appropriate for molecular diagnosis. Any charcoal swabs received for PCR will be discarded.
Vesicle fluids:
For poxvirus investigations contact the laboratory on 01980 612348 for advice. Vesicle fluid in a syringe or bijou, or a swab in VTM, are preferred.

Taking the samples: Specimens should be taken by experienced professionals using appropriate personal protective equipment. The use of a vacuum blood sampling system is strongly advised to reduce the risk of sharps injuries.

2.11. Packaging and transporting specimens

General recommendation: A triple packaging system is recommended by the World Health Organization; this should be used for all infectious substances and comprises three layers.

- Primary receptacle. A primary watertight, leak-proof receptacle containing the specimen. The receptacle is packaged with enough absorbent material to absorb all fluid in case of breakage.
- Secondary packaging. A second durable, watertight, leak-proof packaging to enclose and protect the primary receptacle(s). Several cushioned primary receptacles may be placed in one secondary packaging, but sufficient additional absorbent material shall be used to absorb all fluid in case of breakage.
- Outer packaging. Secondary packagings are placed in outer shipping packagings with suitable cushioning material. Outer packagings protect their contents from outside influences, such as physical damage, while in transit. The smallest overall external dimension shall be 10x10 cm.

Category A: An infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Infectious substances meeting these criteria which cause disease in humans or both in humans

and animals shall be assigned to United Nations number UN 2814 and packed according to Packing Instructions P620 for transport by road or rail. Viral haemorrhagic fevers fall into Category A.

Further information on packaging requirements necessary for Category A substances can be found in the following documents:

- WHO Guidance on regulations for the Transport of Infectious Substances 2010– 2011 http://www.who.int/ihr/publications/who_hse_ihr_20100801_en.pdf
- Department of Health Transport of Infectious Substances - Best Practice Guidance for Microbiology Laboratories 2007 http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_075439

Category B: An infectious substance that does not meet the criteria for inclusion in Category A. Infectious substances in Category B shall be assigned to UN 3373 and must be packed to Packing Instructions P650.

2.12. Courier and postal deliveries

Recommended couriers for transporting urgent Category A samples:

- PDP: 01784 420 466
- DGI : 0208 814 0404

2.13. Results and reports

Printed results

Printed results are no longer routinely sent unless the referring laboratory is not registered to ***E-lab.***

E-lab details can be found on www.hpa.org.uk/elab

Missing reports and archived reports can be posted if requested

Telephone results

All on-call results and routine significant results are telephoned out.

2.14. Medical advice regarding the diagnosis and treatment of infection

Clinical interpretation and diagnostic advice is provided by Dr Tim Brooks (Consultant Microbiologist and Clinical Services Director, RIPL), Dr Andrew Simpson (Consultant Microbiologist), Dr Emma Aarons (Consultant Virologist), Dr Matthew Dryden (Consultant Microbiologist), Dr M Sudhanva (Hon. Consultant Virologist) and a Specialty Trainee (Registrar equivalent).

2.15. Cost of testing

Please note: costs are subject to change at short notice.

NHS hospital laboratories:

The differential diagnosis for travellers returning to the UK with acute fever, or for an undiagnosed rare infection, typically requires a **panel of tests** to be carried out to arrive at either a positive diagnosis or to exclude potential infections in a timely manner compatible with responsive patient care. In general, it is difficult to clinically diagnose all imported viral and rickettsial infections without laboratory generated evidence.

From 1 April 2012, a new pricing structure was implemented in accordance with the letter of notice provided by HPA MS to all NHS Trusts.

From 1 April 2014, the cost for running an initial panel of serological and molecular tests will be £128.00. All these prices are subject to inflationary fluctuations.

Laboratories requesting **specific individual tests ONLY** will be charged per test from:

Immunofluorescence:	£56.18
Serology:	£58.26
Block based PCR:	£71.79
Real time PCR:	£78.03
Lyme disease:	See Appendix 1

Exceptions to this are tests for *Coxiella*, Hantaviruses, *Brucella spp.*, *Bacillus anthracis*, *Orientia tsutsugamushi*, *Rickettsia spp.*, *Yersinia pestis*, and other bacterial and viral culture tests for which separate charges may apply.

Borrelia tests are not covered by the screen charge and are charged separately.

Private hospital laboratories:

The cost for running a **panel** of serological and molecular tests based on the clinical history and epidemiology provided will be **£192.00**.

Laboratories requesting **specific individual tests ONLY** will be charged as follows per test from:

Immunofluorescence:	£86
Serology:	£98
Block based PCR:	£110
Real time PCR:	£117
Lyme disease:	See Appendix 1

Exceptions to this are tests for Coxiella, Hantaviruses, *Brucella spp.*, *Bacillus anthracis*, *Orientia tsutsugamushi*, *Rickettsia spp.*, *Yersinia pestis,* and other bacterial and viral culture tests for which separate charges may apply.

Borrelia tests are not covered by the screen charge and are charged separately.

Non-UK international hospital laboratories: Pricing similar to private hospital laboratories as above.

PLEASE NOTE THAT rejected or inappropriate specimens due to inappropriate packaging, incorrect referrals *etc* incur a disposal/handling fee (£15.60 NHS, £23.41 for other customers).

2.16. Pathogens, samples, tests and turn-around-times (TAT)

The standard turn-around times (TAT) in the following table indicate the time taken from receipt of the sample at RIPL to the test result being available, and are given in working days (i.e. excluding weekends and public holidays). Any significant results (e.g. PCR positive) are telephoned.

On-call testing is focused on Viral Haemorrhagic Fevers (VHFs), but other assays may be included for exclusion purposes at the discretion of the RIPL Medical Consultant. The TAT for on-call tests are given in hours. All on-call test results are telephoned.

Assays for other arenaviruses and bunyaviruses are under investigation – please telephone to enquire.

Pathogen(s)	**EDTA blood**	**Serum**	**Non blood samples**	**Standard TAT**	**TAT on-*call***
Anaplasma phagocytophilum		✔		Serology: 2-4 working days	Not available
Bacillus anthracis	✔	✔	Tissue biopsy, post-mortem tissue, culture, eschar, lesion washings, suspect colonies	PCR: 1-2 working days Serology is batched monthly	PCR 6-12 h
Borrelia burgdorferi	✔	✔	Joint fluid, biopsy, CSF	See Appendix 1	Not available
Brucella spp.	✔	✔		PCR: 1-2 working days Serology: Please refer samples to the Brucella Reference Unit, University Hospital Aintree, Liverpool.	Not available
Burkholderia mallei	✔	✔	Tissue biopsy, pus/discharge Suspect colonies	PCR: 1-2 working days	Not available
Burkholderia pseudomallei	✔	✔	Tissue, pus/discharge Suspect colonies	PCR: 1-2 working days	Not available
Coxiella burnetii (Q-fever)	✔	✔	Tissue, heart valve	PCR: 1-2 working days if urgent, otherwise 1 week Serology: 2-5 working days	Not available
Crimean-Congo haemorrhagic fever (CCHF) virus	✔	✔	Urine, tissue	PCR: 1-2 working days Serology: Please enquire	PCR 6-12 h

Pathogen(s)	EDTA blood	Serum	Non blood samples	Standard TAT	TAT on-*call*
Chikungunya virus	✔	✔		PCR: 1-2 working days Serology: 2-5 working days	PCR discretionary (6-12 h)
Dengue virus	✔	✔		PCR 1-2 working days Serology: 2-4 working days	PCR discretionary (6-12 h)
Ebola group viruses	✔	✔	Tissue	PCR: 1-2 working days	PCR 6-12 h
Western, Eastern & Venezuelan equine encephalitis viruses	✔	✔	CSF	PCR: 1-2 working days Serology: 2-5 working days	Not available
Francisella tularensis	✔	✔	Tissue, wound swab, culture	PCR: 1-2 working days Serology: 2-5 working days	Not available
Hendra virus Nipah virus	✔	✔	CSF	PCR: 1-2 working days Serology: Please enquire	PCR 6-12 h
Hantaviruses	✔	✔	Urine	PCR is batched 6 weekly but urgent testing might be possible in some cases: please enquire Serology: 2-4 working days	Not Available
Japanese encephalitis virus	✔	✔	CSF	PCR: 1-2 working days Serology: 2-4 working days	Not available
Junin virus and other South American arenaviruses	✔	✔	Urine	PCR: Please enquire	Not available
Kunjin virus		✔	CSF	Serology: Please enquire	Not available
Lassa virus	✔	✔	Urine, throat swab, tissue	PCR: 1-2 days Serology: Please enquire	PCR 6-12 h
Lymphocytic Choriomeningitis Virus (LCMV)		✔	Urine	PCR: Please refer samples to the Viral Zoonosis Unit, PHE Colindale Serology: Please enquire	Not Available

Pathogen(s)	EDTA blood	Serum	Non blood samples	Standard TAT	TAT on-*call*
Leptospira spp.	✔	✔	Urine	PCR: 1-2 working days Serology: Please refer samples to the PHE Leptospira Reference Unit, Hereford Hospital.	PCR discretionary (6-12 h)
Malaria parasites (*Plasmodium* spp.; genus-specific)	✔			PCR: 1-2 working days	PCR discretionary (6-12 h)
Marburg virus	✔	✔	CSF	PCR: 1-2 working days	PCR 6-12 h
Mayaro virus	✔	✔	CSF	PCR: 1-2 working days	Not available
Murray Valley encephalitis virus		✔	CSF	Serology: 2-4 working days	Not available
Orientia tsutsugamushi (Scrub typhus)	✔	✔	Eschar biopsy / CSF	PCR: 1-2 working days Serology: 2-4 working days	PCR discretionary (6-12 h)
Orthopoxviruses	✔		Vesicle fluid / crusts	PCR: 1-2 working days	Not available
Parapoxviruses	✔		Vesicle fluid / crusts	PCR: 1-2 working days	Not available
Rickettsia (spotted fever and epidemic typhus group)	✔	✔	Eschar biopsy / CSF	PCR: 1-2 working days Serology: 2-5 working days	PCR discretionary (6-12 h)
Ross River virus	✔	✔		Serology: 2-4 working days	Not available
Rift Valley fever virus	✔	✔	CSF	PCR: 1-2 working days Serology: 2-4 working days	PCR discretionary (6-12 h)
Sandfly fever viruses (incl. Toscana virus)	✔	✔	CSF	PCR: Please enquire Serology: 2-4 working days	Not available
Sindbis virus		✔		Serology: 2-4 working days	Not available
St Louis Encephalitis virus		✔	CSF	Serology: 2-5 working days	Not available

Pathogen(s)	EDTA blood	Serum	Non blood samples	Standard TAT	TAT on-*call*
Tick Borne Encephalitis group viruses	✔	✔	CSF	PCR: 1-2 working days Serology: 2-4 working days	Not available
West Nile virus	✔	✔	CSF, urine	PCR: 1-2 working days Serology: 2-5 working days	Not available
Yersinia pestis (plague)	✔	✔		PCR: 1-2 working days	PCR discretionary (6-12 h)
Yellow fever virus	✔	✔		PCR: 1-2 working days Serology: 2-4 working days	Not available
Zika virus	✔	✔	Urine	PCR: Please enquire	Not available

Virus isolation capabilities are retained within RIPL but this is not used routinely.

2.17. Submitting tissue samples from deceased people

COMPLIANCE WITH THE HUMAN TISSUE ACT

The Rare and Imported Pathogens Laboratory is licensed by the Human Tissue Authority (HTA) under the Human Tissue Act 2004 (covering England, Wales and Northern Ireland), to store tissues from deceased people for scheduled purposes. Post mortem samples are submitted to RIPL by coroners or pathologists for examination to help them determine the cause of death.

Obtaining consent to remove, store and use human tissues for a scheduled purpose is one of the underlying principles of the Human Tissue Act. RIPL receives post-mortem samples from Coroners' post-mortems or from NHS establishments across the UK and therefore we are performing the examination under the authority of the coroner. Unless consent has been obtained or the coroner has requested that samples are retained for further testing, samples are disposed of within three months of the initial test being performed.

When tissue samples from deceased people are received by RIPL they are retained securely and confidentiality is maintained in compliance with Caldicott principles, as for all samples received by RIPL. It is normal practice for tissue samples from the deceased to be disposed of in the same way as all other clinical samples received by RIPL. However, we will adhere to any specific requirements regarding disposal or the return of tissue samples if requested by the sending coroner or pathologist.

2.18. Additional information & links

Urgent clinical advice on management and diagnosis of imported diseases can be obtained through the Imported Fever Service, a partnership between RIPL, the Tropical and Infectious Diseases Unit, Royal Liverpool Hospital and the Hospital for Tropical Diseases, London. The service details are available through local consultant microbiologists, virologists and infectious disease physicians who should be contacted in the first instance.

2.19. Services to the public

RIPL does not offer diagnostic services to members of the public except through a registered medical practitioner. Results CAN ONLY BE ISSUED to the requesting physician or medical unit and will not be given to patients directly. We reserve the right to check the authenticity of callers in order to protect the privacy of patients' personal data.

2.20. Education services

RIPL can provide occasional support for educational activities for groups or individuals. School and professional groups are invited to write to us with their requirements. Professional scientists and medical staff may visit for familiarization with our work or for research attachments subject to approval from RIPL staff, their own management and if relevant, national authorities.

3. Appendix 1: Lyme Disease

3.1. Testing for Lyme Disease

The Lyme disease testing service moved from Southampton to RIPL on 1st June 2012.

3.2. Tests offered:

Serology is the primary test for Lyme disease. RIPL uses a two tier testing methodology. The screening test is a C6 antigen-based ELISA (combined IgG and IgM), followed by a confirmatory immunoblot (separate IgG and IgM line blots).

PCR is also available and may be useful in testing joint fluid, biopsy tissue and, occasionally, CSF. PCR is not usually performed on blood but please contact us to discuss if this test may be required.

We also have capacity to perform further testing for diseases that share some common features with Lyme. Medical personnel are invited to contact us to discuss the most suitable tests we can offer for their patient.

3.3. Sample type

Please send **serum** for routine Lyme testing.

For PCR, the following sample types are accepted:

Joint fluid, tissue, CSF and EDTA blood (after discussion with RIPL microbiologist)

Please refer samples with as much clinical data as possible including clinical presentation, date of symptom onset, history of tick bite, and UK location or country of exposure. Please also provide the results of any Lyme screening tests you or other laboratories have performed. A request form is available on the PHE website Lyme pages.

3.4. Prices

	NHS	Commercial
Lyme EIA	£16.65	£51.50
Lyme immunoblot (IgG+IgM) and EIA	£81.84	£117.46
Lyme PCR	£39.96	£87.06
Anaplasma IFA	£56.18	£85.31

3.5. Turn-around time:

ELISA: 4 days

IgG and IgM immunoblot: 5 working days

Please note: An out-of-hours testing service is not provided.

3.6. Contact details:

In case of queries, medical professionals should contact +44(0)1980 612348 (09:00 – 17:00 Monday – Friday) or email lyme.RIPL@phe.gov.uk.

There is no clinic at PHE Porton **and we are unable to see patients or give telephone medical advice directly to members of the public**. Please note that we may verify the authenticity of callers before giving results to ensure that we meet the requirements of patient confidentiality and good medical practice.

Further information about Lyme disease can be found at:
http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/LymeDisease/

The RIPL Lyme disease request form can be found at:

http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/LymeDisease/LymeDiseaseDiagnosticServices/lym010LymeDiagnosticServices/