

MY LAB

RARE AND IMPORTED PATHOGENS

Laboratory Manager **Barry Gibney** gives a guided tour of his Public Health England laboratory at Porton Down.



The Rare and Imported Pathogens Laboratory (RIPL), based at Public Health England Porton Down, provides a clinical diagnostic service

for pathogenic arboviruses, haemorrhagic fevers and a number of ACDP3 bacterial pathogens, including rickettsiae, *Coxiella burnetii* and *Bacillus anthracis*. We are also the frontline *Leptospira* reference unit and deliver Lyme disease screening and confirmation testing. The department provides testing for the whole of the NHS, while also aiding a wide array of clinical, veterinary and environmental services throughout the world.

Our specimen reception team is tasked with unpacking and preparing a portion of the 40,000 samples we receive annually. Whilst this number may pale in comparison to the hundreds of thousands dealt with by the routine pathology departments of large teaching hospitals, the sheer variety of unusual requests means that each sample requires careful and considered thought as to how to process it safely and effectively. Following this, it is the job of our technical team to provide diagnostic testing using our geographical panel approach.

The department routinely performs thousands of serological and molecular investigations for a variety of travel-associated pathogens, including dengue fever, chikungunya, Zika virus and West



Nile virus. Techniques include real-time PCR, ELISA, immunofluorescence and immunoblot assays. Culture methods are used for bacterial investigations.

Furthermore, RIPL provides diagnostic testing for ACDP4 organisms responsible for viral haemorrhagic fever, notably Ebola, Lassa, Marburg and Crimean Congo haemorrhagic fever viruses. This requires specialised containment facilities, and staff are extensively trained and assessed prior to work on live samples. While the methods will be familiar to most virology specialists, the targets we are hoping to identify are anything but routine.

The department is currently accredited to Clinical Pathology Accreditation standards and is awaiting a decision by UKAS regarding ISO 15189 status.

Considering the specialisation of RIPL, it is perhaps not surprising that the department has played a frontline role

both at home and in the field in the management of a number of outbreaks and epidemics – most notably the UK anthrax outbreak in intravenous drug users (2012), the West African Ebola epidemic (2014-16) and the recent surge in cases of Zika virus originating in South America (2016).

The ever-developing nature of the work undertaken in RIPL means that the range of commercial assays available for diagnostic use is small, or occasionally non-existent. It is therefore necessary for the department to evaluate commercial assays thoroughly to select the most appropriate

one, and, if none is suitable, to design and develop in-house methods for novel pathogens. We have a specialist Diagnostic Support Team to identify and validate assays to a rigorous quality standard prior to implementation. The clinical and scientific team keeps a continuous watch on emerging diseases and outbreaks, and works with manufacturers and universities as well as internally to have a diagnostic capability in place before a significant number of cases appear. As an example, RIPL was testing for Zika by PCR in likely cases from 2013, when the disease began to appear in Micronesia.

RIPL provides a dynamic work environment for its entire workforce, regardless of role. The ever-changing nature of imported disease ensures that we are kept constantly on our toes, ready to respond to the next challenge. 