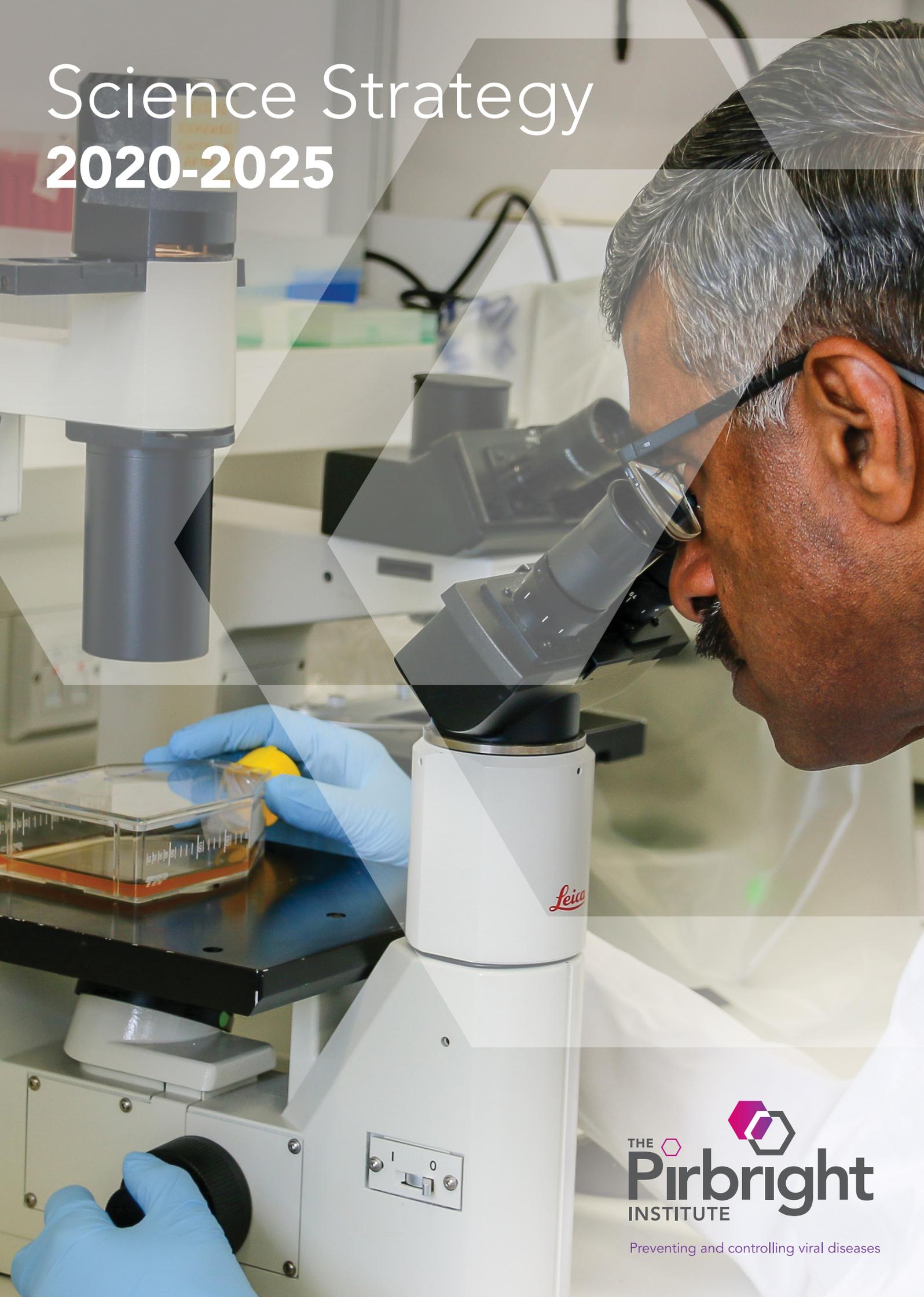


Science Strategy 2020-2025

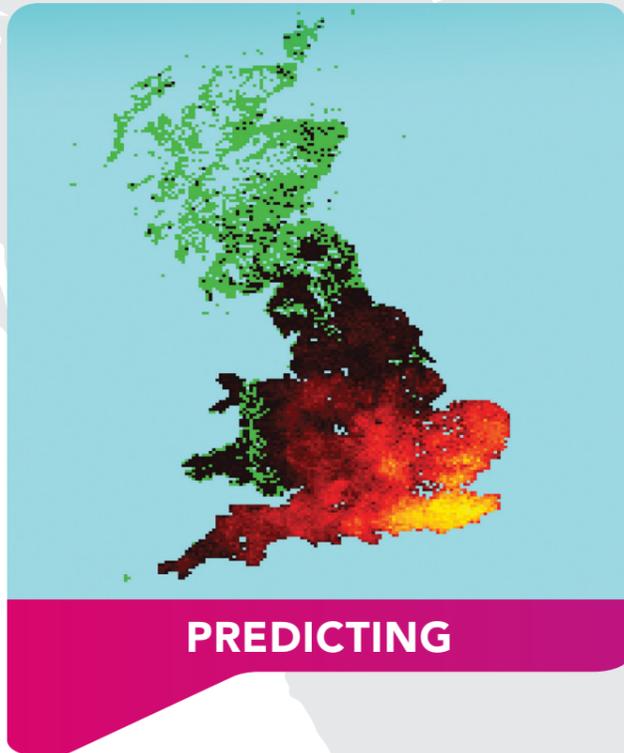


OUR SCIENTIFIC VISION

To provide the UK with its capacity to predict, detect, understand and respond to high-consequence livestock and zoonotic viral diseases to protect our food and economic security and improve the health and wellbeing of animals and people.

OUR STRATEGIC PRIORITIES:

- 1) To deliver excellent applied and fundamental bioscience research on viruses, hosts and vectors, nationally and internationally
- 2) To identify, contain and eradicate important viral diseases of livestock and those that spread from animals to people which threaten or occur in the UK
- 3) To contribute to global food security and one health agendas through the dissemination of our scientific knowledge of virus and host to maximise its impact in disease control, surveillance and prediction globally
- 4) To provide national facilities and expertise in high containment laboratories, insectaries, animal facilities and collections of vectors and viruses
- 5) To inspire, train and recruit the next generation of scientists through a programme of knowledge exchange, training and development in high containment research and biosecurity



PREDICTING

Monitoring the worldwide spread of viral diseases to identify threats to health and economic prosperity and provide global early warning.

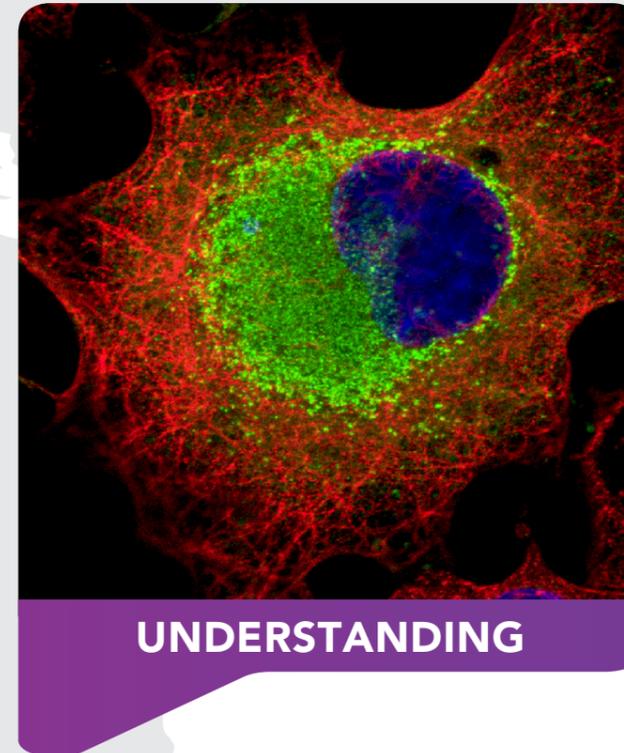
- Controlling viral threats before they reach the UK
- Integrating reference laboratory services with fundamental and applied research
- Predicting virus incursion routes before they happen
- Leading and contributing to international viral disease control networks
- Building disease prevention capacity in low and middle income countries
- Forecasting the epidemiology of virus outbreaks



DETECTING

Acting as a key UK and global leader in the detection, surveillance and diagnosis of high-consequence viral diseases.

- Developing and validating diagnostic tests
- Translating research findings into commercialised diagnostic platforms
- Monitoring the presence of viruses in livestock, wildlife and vectors
- Differentiating between vaccinated and infected hosts in endemic regions
- Undertaking surveillance during and after virus outbreaks



UNDERSTANDING

Addressing key questions in fundamental science and identifying the gaps in our knowledge of the biology of viruses and their natural hosts.

- Characterising virus structure, genetics, replication and evolution
- Understanding host responses through a combination of genetic, genomic and proteomic data and fundamental immunology
- Pinpointing factors influencing arthropod capacity to act as virus vectors in the laboratory and natural environment
- Understanding routes of viral transmission between hosts
- Investigating virus-vector-host interactions



RESPONDING

Containing and eliminating viral diseases through the development of vaccines, control of insect vectors, and improvement of host resilience.

- Developing new innovative vaccines
- Providing vaccinology expertise to academic and industrial partners
- Developing alternative control methods where vaccines are unavailable or not viable
- Providing expert advice and new control measures to international disease control agencies and stakeholders
- Supplying primary diagnostics during virus outbreaks
- High resolution genetic mapping and genetic modification to produce refractory and resilient hosts and control vector transmission

OUR CAPABILITIES ARE:

- World-class scientists who are experts in the fields of virology, vaccinology, immunology, epidemiology, entomology, biomathematics and genetic engineering
- Unique high containment research facilities to study animal viruses of economic importance in the natural host (*in vitro* and *in vivo* study facilities)
- International reference laboratories accredited to ISO/IEC 17025, a UKAS accredited laboratory number 4025
- Genetically defined and inbred lines of animals, collections of arthropod vectors and a range of well characterised virus stocks
- Production and engineering of recombinant antibodies for veterinary research
- Multidisciplinary immunological research to enable detailed understanding of recognition and control of viral infection by the natural host
- Facilities for infection of vectors with viruses
- Next generation sequencing and *in vitro* bioimaging in high containment
- High containment engineering and health, safety and biosafety expertise



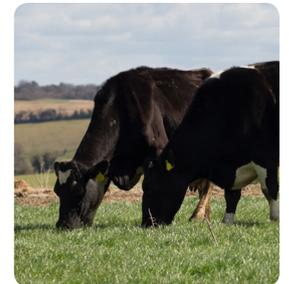
High containment research facilities in the BBSRC National Virology Centre: The Plowright Building.



The BBSRC National Virology Centre: The Plowright Building. Photo courtesy of HDR Architecture, Inc.; © 2014 Dan Schwalm/HDR, Inc.

OUR KEY STAKEHOLDERS ARE:

- Biotechnology and Biological Sciences Research Council (BBSRC), part of UK Research and Innovation (UKRI)
- UK Department for Environment, Food and Rural Affairs (Defra)
- Other UK research funding agencies
- International funding and disease control agencies, such as the World Organisation for Animal Health (OIE), Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO), the European Commission, and Bill & Melinda Gates Foundation
- Veterinary vaccine manufacturers and animal breeding companies
- Farmers and livestock keepers



The Pirbright Institute

Preventing and controlling viral diseases

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