

## Rapid Response Call Awards

### Virus: natural history, transmission and diagnostics

- **Professor Richard Tedder, Imperial College London, £0.4 million:** Using the same techniques as previously applied to Zika and Ebola, the team will develop a non-invasive test, using a sample of fluid from the mouth, to detect the immune antibodies (IgG and IgM) that indicate a person has been infected with SARS-CoV-2. They aim to develop a test within 6 months that could be used to diagnose people who have had SARS-CoV-2.
- **Allan Bennett, Public Health England, £0.3 million:** They will study how SARS-CoV-2 can be transmitted, by determining how long SARS-CoV-2 can survive in the air and on different types of surfaces (for example, those found in the healthcare, domestic and community settings) under controlled environmental conditions (a range of temperatures and humidities) representative of those found in different settings and countries. Methods of decontamination will also be investigated.
- **Dr Sumana Sanyal, University of Oxford, £0.2 million:** The virus, SARS-CoV-2, uses enzymes within infected cells called proteases (enzymes which cut up other proteins), so it can replicate and spread. This study will identify which proteases are necessary for the virus, to provide targets for future drugs and vaccine development.

### Epidemiological studies

- **Professor Andrew Hayward, University College London, £3.2 million:** This study 'Virus Watch' will study 25,000 individuals across the country in a nationally representative household cohort (April to March 2021). Within this cohort, 10,000 people will be tested for SARS-CoV-2 and other circulating viruses every time they report symptoms that could be caused by COVID-19. When antibody tests are available, participants will be invited to have these tests to understand who has been infected and to measure the protective effect of antibodies. All participants will provide information on symptoms and behaviour and there will be an optional mobile app for analysis of movement patterns to help understand how social distancing measures affect the risk of infection.
- **Dr Eleni Nastouli, University College London, £1.5 million:** 200 healthcare workers at University College London Hospitals NHS Foundation Trust will be tested for SARS-CoV-2 repeatedly over time to assess the risk of acquiring the infection. They will also study healthcare worker behaviour, using digital tracking systems and interviews, and use this data to better inform health and safety measures to protect staff and patients, and hospital infection prevention and control. Ethical questions around staff testing and infection control measures will also be addressed. The team plans to use the data to advise on policy for the current pandemic and preparedness for future ones.
- **Dr John Edmunds, London School of Hygiene & Tropical Medicine, £0.5 million:** To provide modelling support, including real-time forecasting and scenario analyses, to help improve decisions about the control of COVID-19. In addition, to undertake behavioural surveillance to help track adherence to social distancing measures and how this affects the rate of disease spread within the UK.
- **Professor Matthew Snape, Oxford Vaccine Group, University of Oxford, £0.6 million:** With Public Health England, they will use an existing study of infectious disease immunity in children

and teenagers 0 to 19 years old to study the presence of antibodies against COVID-19 (a marker of having had the disease and now having immunity) in approximately 400 children and teenagers per month for the duration of the COVID-19 outbreak, and they will collect information on recent respiratory illnesses and relevant medical history.

- **Professor Aziz Sheikh, University of Edinburgh, £0.5 million:** Using anonymised electronic health records (including GP and hospital visits and test results) from 1.2 million people in Scotland, they will track the progress of the COVID-19 epidemic in near real-time. They will also process blood samples and swabs of the virus taken from a sub-sample of the participants, to determine who has been exposed and to sequence the virus genomes. If vaccines or anti-viral therapies become available, their effectiveness will be monitored.
- **Professor Martie van Tongeren, University of Manchester, £0.3 million:** They will investigate the role of gig workers, in particular delivery workers, and delivery supply chains in preventing disease transmission. The project will use interviews with workers and data on deliveries to construct mathematical models to determine how the delivery sector contributes to minimising the risk of spreading the disease and the benefits of additional measures to protect the workers.
- **Dr Leon Danon, University of Exeter, £0.2 million:** The researchers will adapt and develop mathematical models of disease spread and movement within the UK to evaluate the impact of control and mitigation strategies, including travel restrictions, border screening and quarantine policies, and to predict where and when the disease will spread.
- **Dr Anne Presanis, MRC Biostatistics Unit, University of Cambridge, £0.2 million:** To understand the severity of the epidemic – such as the proportion of infections that result in hospitalisation or death – they will use Bayesian statistical models to combine information from multiple datasets emerging from various sources, such as numbers accessing healthcare, numbers of deaths, population surveillance data, and cohort and household studies.

## Clinical characterization and management

- **Dr Kenneth Baillie University of Edinburgh, Prof. Peter Openshaw Imperial College London, & Prof. Calum Semple University of Liverpool, £4.9 million** They will collect samples and data from COVID-19 patients in the UK to answer many urgent questions about the virus and provide real-time information, which could help to control the outbreak and improve treatment for patients. Their questions include: who in the population is at higher risk of severe illness; what is the best way to diagnose the disease; what is happening in their immune systems to help or harm them; closely monitoring the effects of drugs used in patients with COVID-19; how long are people infectious for and from which bodily fluids; and are people infected with other viruses (e.g. flu) at the same time? They will recruit at least the first 1,300 UK patients who agree to take part over the next year and aim to start communicating their initial results in months. The team's capacity builds on planning over the past 8 years as part of the International Severe Acute Respiratory Infection Consortium, and it includes co-investigators from six UK universities and Public Health England.
- **Professor Christoph Lees and Dr Ed Mullins, Imperial College London, £0.3 million:** To better understand some specific research questions as to how COVID-19 affects early pregnancy, fetal growth, prematurity and virus transmission to the baby the researchers will construct a registry of women with suspected and confirmed COVID-19 from early pregnancy to after delivery of the baby. Healthcare professionals from the UK and across many international centres will contribute data via a web portal.

## Candidate therapeutics R&D

- **Professor Peter Horby, University of Oxford, £2.1 million** A clinical trial started last week in the UK to test if existing or new drugs can help patients hospitalised with confirmed COVID-19. The drugs will be tested to see if they are safe and effective when added to the usual standard of care. The trial will have an 'adaptive' design, meaning it can test new therapies as they become available. The first two therapies to be tested will be: lopinavir-ritonavir and low-dose corticosteroids. The trial is called Randomised Evaluation of COVID-19 Therapy (RECOVERY). The research team's ambitious aim is to have data available to inform patient treatment within three months.
- **Professor Christopher Butler, University of Oxford, £1.7 million:** The first clinical trial in COVID-19 patients consulting their GP, '[PRINCIPLE](#)', will initially test if the anti-malarial drug hydroxychloroquine can reduce the need for people to go to hospital or speed up their recovery. They will recruit patients aged over 65 years (or aged 50-64 years with underlying health conditions), who consult with their GP (this trial is a national platform trial and is potentially available to all GP practices in the UK) and have COVID-19 symptoms. Patients will be tested for COVID-19 where possible, and will receive either the usual care provided plus hydroxychloroquine 200mg twice a day for 7 days, or, soon, azithromycin for 3-5 days, or usual supportive care without any experimental treatment. The trial aims to recruit over 3,000 people, and has been designed to be flexible, so new suitable treatments can be added into the trial when these become available.
- **Professor Xiao-Ning Xu, Chelsea and Westminster Hospital, Imperial College London, £0.6million** The researchers will develop antibodies that target the novel coronavirus with the aim of developing a new therapy for COVID-19. Antibodies are molecules produced by the body's immune system that can specifically recognise and bind to structures, such as those on the surface of a virus, to block the virus entry and instruct the immune system to destroy it. They have already identified some antibodies that might bind to proteins from the COVID-19 coronavirus. In collaboration with China, the scientists will use these in this project to develop a potential antibody therapy, with the aim of getting the therapy to the stage where it is ready to enter clinical trials to determine if it can treat a range of coronavirus infections including the COVID-19 coronavirus.
- **Dr Stuart Dowall, Public Health England, £0.4 million:** Antibodies can bind proteins on the virus surface and disrupt entry into cells. The team aim to create a purified ovine immunoglobulin preparation consisting of polyclonal antibodies (which recognise multiple areas on the target to reduce the chance of escape mutations occurring) by immunising sheep with the SARS-CoV-2 spike protein. The purified ovine immunoglobulin will then be tested for activity to bind and neutralise SARS-CoV-2 virus before testing in animals to determine if it offers protection against infection and disease progression.
- **Professor Ultan Power and Professor Ken Mills, Queens University Belfast, £0.3 million** They will test a library of approximately 1,000 drugs on cells in the laboratory to determine if any can reduce the toxic effects of novel coronavirus infection. The drugs are already approved for use in humans. They will be tested on airway epithelial cells grown in the lab and infected with novel coronavirus to determine if the drugs can reduce virus infection or replication and virus-induced inflammatory responses. This could identify promising drugs for further testing and clinical trials in 12 months.

## Candidate vaccines R&D

- **Professor Sarah Gilbert, University of Oxford, £2.2 million** The team are already developing a new vaccine against the COVID-19, as they initiated vaccine development as soon as the genetic sequence of the novel coronavirus was released. This funding will support preclinical

testing of the new vaccine, vaccine manufacturing and then clinical trials in people. The first stage of human testing will be in adults aged 18-50, later expanding the trial to adults over 50 years and school age children. The vaccine is made from a harmless virus, an adenovirus, which has been altered to produce the surface spike protein of the coronavirus after vaccination, to prime the immune system to recognise and attack the coronavirus. If the vaccine is shown to be safe and effective in these earlier trials, vaccine manufacturing will be scaled up for larger studies. The vaccine utilises the same technique as a vaccine the team previously developed for the closely related MERS coronavirus, which showed promise in animal and early-stage human testing. This earlier research was funded by the UK Vaccines Network (a DHSC and UKRI initiative) in 2018.

- **Dr Sandy Douglas, University of Oxford, £0.4 million** The team are aiming to develop manufacturing processes for producing adenovirus vaccines at a million-dose scale, so that - if clinical trials are successful - a vaccine could be made available to high-risk groups as quickly as possible. They are working with Professor Sarah Gilbert's team, who are developing promising novel coronavirus vaccines by modifying harmless adenoviruses.
- **Prof Robin Shattock, Imperial College London, £1.7 million:** They have developed a promising RNA vaccine. When it's injected, it will deliver the genetic instructions to muscle cells to make the SARS-CoV-2 'spike' surface protein, which should provoke an immune response and create immunity to the virus. They have modified the RNA sequence to create a stabilised version of the spike protein, which they hope will provoke the body to produce more protective antibodies. This funding will enable them to take the vaccine through GMP manufacturing, testing in animal models for safety and efficacy, regulatory and ethical approval, and, if that's successful, a phase I clinical trial in healthy human volunteers.
- **Professor Miles Carroll, Public Health England, £0.4 million:** They will develop an animal model of SARS-CoV-2 infection in non-human primates, which can be used to test if new vaccines and therapies are effective and, importantly, safe. This will enable researchers to address concerns that vaccines that enhance the immune response could potentially worsen COVID-19.

## Social sciences in the outbreak response

- **Professor Isabel Oliver, Public Health England, £0.4 million:** They will evaluate the public health measures, specifically they will conduct surveys and interviews to assess the effectiveness and impacts of the 14 day self-isolation advice on mental health and wellbeing. They will also develop and test different messages to encourage people to follow public health advice, to better inform the current public health response.
- **Professor Jane Duckett, University of Glasgow, £0.3 million:** The research team will study Chinese policy documents and social media databases, and will conduct local interviews in four regions of China. We will document in detail Chinese central and local government measures to tackle the COVID-19 epidemic and evaluate their societal impacts – to inform the international response.
- **Professor Trudie Lang, University of Oxford, £0.3 million:** Building on lessons learnt in the Zika and Ebola outbreaks, the Global Health Network will deliver and share trusted research tools, guidance and training, for example providing guidance on how to run studies in local clinics and hospitals. They will work with partners internationally to create lasting research networks to support evidence generation in challenging settings, so that better quality, standardised data is shared faster worldwide.

- **Professor Sally Sheard, University of Liverpool, and Dr Nina Gobat, University of Oxford, £0.3 million:** With colleagues at the University of Oxford, they will analyse the UK pandemic response by collecting real-time responses from senior policymakers and stakeholders (PHE, DHSC, NHS) and the frontline experiences of healthcare workers, and by studying media and document sources. Their findings will inform senior policymakers.
- **Professor Lucy Yardley, University of Southampton and University of Bristol, £0.2 million:** The 'Germ-Defence' website was shown to reduce infection transmission in the home in the swine flu pandemic and seasonal flu years, and will now be rapidly adapted for COVID-19 using novel methods of public engagement and feedback. It will be disseminated in the UK and internationally, evaluating its effects on infection control attitudes and behaviour

