



Briefing: Testing for COVID-19

24 March 2020

Background

On 31 December 2019, the World Health Organisation (WHO) was informed of a [cluster of cases of pneumonia of unknown cause](#) detected in Wuhan City, Hubei Province, China. On [12 January 2020](#) it was announced that a novel coronavirus had been identified in samples obtained from cases and that initial analysis of virus genetic sequences suggested that this was the cause of the outbreak. This virus is [referred to as SARS-CoV-2](#), and the associated disease as COVID-19.

The recent emergence of this virus means that knowledge of the infection is developing all the time. It is increasingly clear that many people have mild or even no symptoms of infection. However, a small percentage of people have life-threatening disease and admission of these patients to hospital is likely to cause severe healthcare disruption.

Which Royal College of Pathologists members are involved?

The College microbiology, virology and infection control team members continue to support patients, the public and College members during the spread of COVID-19.

Medical microbiologists and virologists are not only laboratory doctors; they also see patients on wards and in clinics where they diagnose and guide treatment even when the cause of an infection is not clear. They deal with all ages and types of patients, from premature babies to older people, medical, surgical, cancer and transplant patients. Most medical microbiologists and virologists also give advice to general practitioners on the management of infection in the community.

Virologists

Virologists are responsible for diagnosing the viral infections and also investigate the pharmacological response of viruses to antiviral drugs and the evolution of drug resistance. When there is a viral outbreak on a ward, virologists work together with the hospital's infection prevention team, advising staff on the ward on the extent of transmission and how to limit further infection.

Medical microbiologists

Many microbiologists are infection prevention doctors for their hospital, directing measures to protect patients from cross-infection from other patients, visitors, staff and the hospital environment including the air, food and water supplies. Microbiologists advise on any further sampling to identify possible super-infection with bacteria, and the treatment of those infections.

Many other specialties are supporting virology colleagues, including molecular pathology and genomics, and colleagues in public health departments and we are grateful for all their input.

How pathologists test for COVID-19

Laboratory tests for COVID-19 are being developed rapidly. Public Health England has made their test available to non-PHE virology laboratories. Commercial tests are also increasingly available and the performance of these tests are being compared for important features including accuracy and speed of turnaround. At the moment, testing capacity is limiting the number of tests that can be provided. Consequently, requests for laboratory testing of individuals must meet [the guidance criteria for testing as issued by Public Health England](#). Testing involves taking a swab of the nose or throat (upper respiratory tract) or samples of sputum from the lower respiratory tract. Clinical staff notify laboratory staff when specimens are submitted from a patient with suspected or confirmed COVID-19, by completing request forms or electronic test ordering systems, and by direct communication with the laboratory.¹

- In the lab, scientists look for genetic sequences specific to SARS-CoV2.
- The scientists extract any genetic information from the throat swabs and sputum samples. As the viral genome is made of Ribonucleic acid (RNA), this involves first turning the RNA into DNA.
- The purified genetic material is then mixed with a set of other ingredients and the entire solution is placed in a testing machine.
- If a patient's specimen contains coronavirus then the viral genetic material will be amplified and the machine will give a positive result.

Lab testing is vitally important for the diagnosis and therefore control of COVID-19. The clinical features of COVID-19 infection are not distinctive. Only lab testing can distinguish between COVID-19 and other causes of acute respiratory infection. Consequently, hospital infection prevention and community public health measures rely heavily on the ability of laboratories to provide rapid and reliable results. This attention to quality underpins all pathology tests in the NHS.

As the UK has moved from the 'contain' to the 'delay' phase of COVID-19, changes have been made to ensure that healthcare workers are protected and all hospitals remain safe, now and in



the future. Therefore, different personal protective equipment (PPE) and mask and respirator combinations are being recommended now for different clinical scenarios and settings; this includes consideration of the infection status (confirmed versus possible cases) and the risk of exposure to aerosols containing the virus.²

How long does it take for a patient to receive their result?

Generally, Public Health England (PHE) and NHS labs will continue to turn most test results around within one day with those who test positive urgently contacted. The length of time can be variable from lab to lab and on the degree of urgency.

The scale of testing as we move through the coronavirus action plan

Infection prevention and control recommendations are being reviewed as the outbreak evolves and the UK moves through the phases described in the [coronavirus action plan](#).

This risk-based approach and the recommendations have been reviewed and approved by experts including NHS England and NHS Improvement, Public Health England, and the [New and Emerging Respiratory Virus Threats Advisory Group \(NERVTAG\)](#). The NERVTAG advises the government on the threat posed by new and emerging respiratory viruses.

As the numbers grow the government has shifted to delaying the epidemic. The delay strategy is designed to flatten the peak and push it into the spring and summer months when the disease may also be less able to spread in the warmer weather.

Acute hospital trusts in England have been asked to routinely test anyone admitted to hospital with evidence of acute lung infection. The plan is a direct response to the detection of COVID-19 in patients in intensive care units in Europe whose illness cannot be traced to any of the areas where the virus is circulating, such as northern Italy. Testing is now mostly taking place on people in hospitals who have symptoms to prioritise those most at risk from severe illness from the virus.

The NHS is now scaling up tests by 500%, with NHS England asking laboratory services across the UK to bring new capacity online. Approximately 1,500 tests are being processed every day at the PHE labs with most tests being turned around within 24 hours. The actual test itself takes around 4 hours and approximately 90 tests are run at the same time.

Currently, 10 NHS microbiology services have been asked to step up capacity. The next phase will call on 29 NHS pathology networks to allocate further testing to their 122 services while ensuring day to day analysis for other conditions continues.

Some manufacturers are selling products for the diagnosis of COVID-19 infection in community settings, such as pharmacies. The current view by PHE is that use of these products is not advised:

- Such tests are very rapid and can work on a range of specimens including serum, plasma or finger-prick whole blood. Some of these products look for virus while others look for the body's immune response to the virus.



- There is little information on the accuracy of the test, or on how a patient's antibody response develops or changes during COVID-19 infection. It is not known whether either a positive or negative result is reliable.
- Currently there is no published evidence about the suitability of these tests for diagnosing COVID-19 infection in a community setting.

Current pathology workforce issues

A recent College workforce planning overview showed that, in the UK, there are 67 Medical Virologists and 682 Medical Microbiologists. Infection Control Doctors (ICDs) are Microbiologists and/or Infectious Diseases consultants.

[In response to the announcement from NHS England regarding the ramping up of coronavirus testing in laboratories](#), Professor Jo Martin, President of The Royal College of Pathologists said:

‘Scaling up pathology testing five-fold for COVID-19 is a considerable ask of our virology and infection experts, but they are already rising to these challenges. They have been working non-stop to support patients and the public in this. They have been flexible and applying their considerable skills in this vital area, and we will do what we can to help them with further support as the situation develops.’

We are working with government, multiple organisations and other stakeholders to help work through challenges with staffing pressures (sickness, transport reductions and self-isolation) and difficulties with the supply chain at several stages in the Polymerase Chain Reaction (PCR) testing process.

Further information

The College [Coronavirus: COVID-19 Resources Hub](#) contains the latest information available on COVID-19. We will update the documents and links on this page when we issue, or are made aware of, updated guidance or advice.

<https://www.rcpath.org/profession/coronavirus-resource-hub.html>

1. <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection#interim-definition-possible-cases>

2. <https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/wuhan-novel-coronavirus-wn-cov-infection-prevention-and-control-guidance>



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About the Royal College of Pathologists

The Royal College of Pathologists is a professional membership organisation with more than 11,000 fellows, affiliates and trainees, of which 23% are based outside of the UK. We are committed to setting and maintaining professional standards and promoting excellence in the teaching and practice of pathology, for the benefit of patients.

Our members include medically and veterinary qualified pathologists and clinical scientists in 17 different specialties, including cellular pathology, haematology, clinical biochemistry, medical microbiology and veterinary pathology.

The College works with pathologists at every stage of their career. We set curricula, organise training and run exams, publish clinical guidelines and best practice recommendations and provide continuing professional development. We engage a wide range of stakeholders to improve awareness and understanding of pathology and the vital role it plays in everybody's healthcare. Working with members, we run programmes to inspire the next generation to study science and join the profession.

