# UK surpasses 500,000 coronavirus (COVID-19) tests genomically sequenced

- Genomic sequencing has made a crucial contribution to the fight against the virus by rapidly identifying variants of concern, understanding transmission and slowing their spread.

- Sequencing provides invaluable data that will support decisions to relax social distancing in the future and help monitor for future variants and infectious disease threats.

The UK has today (Sunday 27 June) surpassed over half a million genomically sequenced positive coronavirus (COVID-19) tests, as the UK's testing programme continues to ramp up.

The strength of the UK's genomics science base and diagnostics sequencing industry has allowed the UK to rapidly identify COVID-19 variants and capture critical data that has helped to track and stay ahead of mutations in the genome of the virus. It is estimated that the UK contributes around 50% of all sequencing that is shared for comparison across the world.

Genomic sequencing is laboratory analysis that identifies a virus's genetic make-up, allowing new variants or mutations in existing variants to be detected. Reaching this milestone is testament to the extraordinary expertise the UK has in genomics and the efforts of researchers, laboratory scientists and analysts, clinicians and policymakers.

Thanks to the UK's world-leading genomic sequencing capability, cases of the Delta (B1.617.2) variant have been quickly detected, as well as other variants of concern. This has allowed the government to rapidly deploy additional support to areas where variants of concern have been prevalent, such as surge testing and enhanced contact tracing, to help slow the spread of variants by breaking chains of transmission.

Innovation Minister Lord Bethell said:

> From Fred Sanger to the modern day, the UK has a proud tradition of developing genetic and genomic technologies which improve the lives of patients across the country and globally.
>
> This milestone is testament to the hard work, dedication and brilliance of researchers and scientists in laboratories across the country, as well as those on the frontline of our battle against this wretched virus.
>
> It is vital that we not only maintain, but develop our global

> leadership in genomics and do our utmost to unlock its enormous potential.
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> The British public has played their part at every stage of this pandemic and I am urging everyone to do their bit by getting tested when asked to do so, so we can continue to detect new variants of concern and protect ourselves and our communities as restrictions ease.

Surge testing has been rolled out to specific areas across the country to monitor and suppress the spread of COVID-19 and to better understand new variants. Genomic sequencing is a key part of surge testing as it enables scientists to continue to identify variants of concern, as well as any changes to known variants or to identify new emerging variants that need to be followed. All positive tests with high enough viral load in surge testing postcodes and from identified test sites will be sent for sequencing.

In addition to surge testing, the government is providing additional support packages to stop the spread of the Delta variant which includes support for those self-isolating and activity to maximise vaccine uptake in the area. This has been rapidly deployed across areas including Bedford, Greater Manchester, Lancashire, Cheshire and Birmingham.

To increase our preparedness and heighten our defences against new variants, we have backed new technology for detecting known variants, known as 'genotype assay testing', which detects mutations that indicate known variants of concern in as little as 48 hours after a positive COVID-19 PCR test result. Genotype assay testing needs to be used after PCR, and in order to detect the maximum number of cases with variants, the government uses confirmatory PCR testing for positive LFD test results in England during lower prevalence periods. Confirmatory tests are used to validate the result of the initial LFD rapid test.

The virus will continue to naturally evolve as it spreads globally, but the UK will continue to use its excellent genomics, epidemiology and virology capacity to monitor all variants to ensure that public health interventions are effective and proportionate.

UKHSA chief executive Jenny Harries said:

> Sequencing genomes has been one of most versatile tools in our armoury in the battle against COVID-19, and as we progress down the roadmap its role only increases in importance – helping us track mutations in the virus and act decisively to stop cases becoming outbreaks.
>
> The UK has shared its exceptional genomics capabilities with the world during this global pandemic and our expertise in this field will be at the heart of our mission at the UK Health Security Agency.

> Every genome sequenced helps us to outmanoeuvre viruses by arming the government and our scientists with reliable data and I am hugely grateful for all those who have worked so hard to enable us to reach this fantastic milestone.

## Process of genome sequencing

Genomic sequencing has been vital in detecting and responding to emerging COVID-19 strains and variants of concern. Public Health England (PHE) has closely monitored how COVID-19 has changed over time with new variants, increasing understanding of how these changes affect the characteristics of the virus and using this insight to evaluate the increased transmissibility of new strains.

In the early stages of the pandemic the COVID-19 Genomics UK (COG-UK) Consortium was created to deliver large-scale and rapid whole-genome virus sequencing to local NHS centres and the government. Data collected by the consortium has helped public health agencies to better manage the outbreak in the UK and inform vaccine development efforts. Sequencing is now being delivered through a programme within UKHSA building upon the work of COG-UK.

After sequencing, virus genome data are combined with clinical and epidemiological datasets in order to help to guide UK public health interventions and policies. In the future, this information will enable the evaluation of novel treatments and non-pharmacological interventions and provide information on community transmission and outbreaks. These data will also allow researchers to identify and evaluate emerging genetic changes in known variants and scrutinise how they affect the ability of the virus to transmit from person to person.

A critical part of our genomic surveillance is to support global safety through testing people travelling overseas. Scientists in PHE upload variant sequence information to GISAID alerting other countries to the presence of variants in different global regions.

The UK's New Variant Assessment Programme is already supporting countries who make use of the UK's genomic sequencing technology to spot new variants, providing them with technical support as well as upskilling their scientists with training.

## UK leadership in genomics

UK research has led to paradigm-shifting discoveries in genetics – from the original discovery of the structure of DNA to our involvement in the Human Genome Project.

The UK has also led the way in translating seminal research into clinical practice and improved patient outcomes. It is also the home of extensive genomics and health research infrastructure, from the UK Biobank, established in 2006 to Genomics England, the NHS England and Improvement Genomic Medicine Service (GMS).

Genomics is just one example of this government’s commitment to driving forwards healthcare innovation in the UK, which will play a central role in its future health resilience, the growth of its life sciences sector and measures to improve patient care.

## Background information

An up-to-date list of areas where surge testing is currently being deployed is available.