Landmark strategy launched to cement UK's position as global leader in genomics

- New 'Genome UK' strategy launched to cement the UK's status as a global leader in genomics
- Strategy will harness genomics to offer patients personalised treatments, predict the risk of chronic diseases for vulnerable groups and enable earlier interventions
- Announcement comes as Matt Hancock takes part in UK-wide COVID-19 genome sequencing study

Health and Social Care Secretary Matt Hancock has today heralded the launch of a landmark new strategy that will secure the UK's future position as a global leader in genomics.

The new National Genomic Healthcare Strategy – Genome UK: the future of healthcare – will ensure the UK can offer patients the best possible predictive, preventative and personalised care by harnessing the potential of advanced genome sequencing.

The strategy sets out how the UK genomics community – from researchers through to the NHS – will come together to harness the latest advances in genetic and genomic science, research and technology for the benefit of patients, to create the most advanced genomic healthcare system in the world.

It will drive improvements in healthcare for patients, reducing boundaries between clinical care and research, and continue to deliver innovative new research projects in the UK. The strategy will unite the genomics community behind a shared vision for the future of the system.

The strategy focuses on 3 key areas:

1. Diagnosis and personalised medicine – using genomic technologies to identify the genetic causes of rare diseases, infectious diseases, and cancer and provide personalised treatments to illness. The NHS will embed the latest genomic technologies to benefit patients.

2. Prevention – genomics will be used to accurately predict the risk of chronic diseases. Subject to validation, national screening programmes could use genomics to identify at-risk populations, including more vulnerable populations and those in harder to reach groups to allow earlier clinical and lifestyle interventions.

3. Research – we will enable more efficient and improved collaboration between researchers and clinicians to benefit patients, while upholding

> the highest standards on the use of data. This includes ensuring that research findings are translated into healthcare settings to benefit patients.

The new strategy builds on the government's existing ambition to analyse five million genomes in the UK by 2023/24, including sequencing 500,000 whole genomes through the NHS Genomic Medicine Service, and 500,000 whole genomes through the UK Biobank.

Health and Social Secretary Matt Hancock:

> Genomics has the potential to transform the future of healthcare by offering patients the very best predictive, preventative and personalised care.
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> The UK is already recognised around the world as a global leader in genomics and this strategy will allow us to go further and faster to help patients right here in our NHS and give them the best possible chance against a range of diseases.
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> The UK is using its expertise in genomics right now to advance our understanding of COVID-19, develop new treatments and help us protect the most vulnerable.

The launch of the strategy comes as Health and Social Care Secretary Matt Hancock calls on others who have recovered from COVID-19 to join him in donating blood as part of a major new study examining genetic susceptibility to the virus. Matt Hancock, who tested positive for coronavirus in March, is urging people who were not hospitalised for their symptoms to give blood so their genetic blueprint can be sequenced to help scientists better understand why some people may be worse affected by the virus than others.

The UK-wide study, led by the University of Edinburgh as part of the GenOMICC consortium and Genomics England, will sequence the genomes of 20,000 people who were severely ill and in intensive care with COVID-19 and compare those with a further 15,000 individuals who had COVID-19 symptoms but did not need to go to hospital.

The study is being funded by Illumina, UKRI, NIHR Bioresource, and the Department of Health and Social Care. The genomic data from participants will be compared to people of similar backgrounds to help understand the variations in an individual's genetic makeup that may lead to a more severe reaction to the virus. The insights gained will help scientists and clinicians find more effective treatments and could help protect the most vulnerable in future outbreaks.

Chris Wigley, CEO of Genomics England, said:

> This is an important moment for genomic healthcare in Britain. With

> the launch of Genome UK, we are a step closer to a future where genomics can improve everyone's health and wellbeing, based on the latest scientific discoveries.
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> Genomics England continues to focus our efforts on enabling genomic healthcare to help doctors diagnose, treat and prevent illnesses, and accelerating genomic research by providing the health data and advanced technology researchers need to make new discoveries and create more effective medicines.
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> The speed at which everyone has come together to work collaboratively on this study demonstrates how significant genomic sequencing is in population health today. We now have a team of the best scientific minds and tech experts all working together at tremendous pace, to analyse the genomic data we have gathered. This work will help us to understand why the virus affects people in different ways, which will potentially allow us to personalise treatment, discover new therapies, save lives – and even prevent future outbreaks.

Life Sciences Minister Lord Bethell said:

> The UK has a proud history as a world leader in genomics.
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> As we face the single biggest global health emergency in our lifetimes, now more than ever, it is paramount that we harness the potential of genomics, to support earlier detection and faster diagnosis of disease, tailor and target treatments and protect against threats to public health.
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> I am confident that the launch of Genome UK – our National Genomic Healthcare Strategy – will help us achieve this.

Professor Sir Mark Caulfield, Chief Scientist at Genomics England, said:

> We do not yet fully understand why some people are more likely to become very ill with this virus and others have little or no symptoms. It is possible that the answer could lie in an individual's genome and therefore we need people of all ages and ethnic backgrounds affected by COVID-19 to volunteer so we have the broadest representation across the UK.
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> This will give us the very best chance of discovering whether a person's response to COVID is influenced by their genetic make-up and if this could identify novel therapies that could help us save lives.

To successfully compare and analyse the data of participants, the study is

looking for volunteers who closely match the age and ethnicities of those who were hospitalised.

The study is particularly keen to hear from members of ethnic minority groups and people who are over 68, who research suggests are the most severely affected groups.

Dr Kenneth Baillie from the Roslin Institute, at the University of Edinburgh, who is leading the study, said:

> When we see patients dying of Covid-19, doctors and nurses in intensive care units often ask – why them? Why did this person become desperately sick, while other similar people are relatively unscathed? We know that this is partly due to genetics. More importantly, we know that if we can find the specific genes that are responsible, in some cases, that can lead us to new treatments.
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> The GenOMICC study was built with funding from patients and their relatives (the FEAT charity), and it owes everything to the patients and their relatives who decide to participate in research to help others, at one of the most difficult times in their lives.

Dame Sue Hill, Senior Responsible Officer for Genomics in England, said:

> The NHS will play a key role in delivering the ambitious vision set out in the National Genomics Healthcare Strategy through the NHS Genomic Medicine Service (GMS). The seven GMS Alliances across England will ensure cutting edge genomics drive improvements in prevention, diagnosis and treatment and deliver faster and improved outcomes for patients. Clinical care will be aligned to enable the broader data and research ambitions to realise the full potential of the NHS and this new strategy allows the UK to continue to be a world-leader in genomics.

Lord Prior, Chairman of NHS England, said:

> Genomics is the new frontier for the prevention, early diagnosis and treatment of inherited disease. It has the potential to change fundamentally the traditional model of healthcare delivery.

Professor Sir Rory Collins, Principal Investigator and Chief Executive of UK Biobank, said:

> I’m delighted to join the National Genomics Board and to help enhance the UK’s position as a global leader in genomics. Genetic analysis of all 500,000 volunteers in the UK Biobank project has enabled researchers to show just how important genetic information

> can be for identifying individuals at increased risk of the most common chronic diseases, in particular cardiovascular disease and different types of cancer.
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> This information is already starting to be used to help improve prevention and treatment strategies within the NHS. I'm confident that the genetic data in UK Biobank will identify many more ways to improve the health of the public as part of the National Genomic Healthcare Strategy.

Jillian Hastings Ward, Chair of the Genomics England Participant Panel, said:

> I hope that many patients and families who have been involved in the 100,000 Genomes Project, like mine, will be excited to see this new strategy. It sets out a vision for the future that makes our health data more useful to researchers and academics, and embeds genomic research into everyday healthcare, while aiming to maintain public and professional trust. It rightly emphasises the importance of engaging with patients, the public, experts and the wider healthcare workforce in the next stages of this journey, as genomic research improves our ability to diagnose, treat and prevent illnesses such as rare diseases, cancer, and COVID-19.

Anyone who tested positive for COVID-19 and has recovered can sign up for the GenOMICC COVID study.

About the National Genomic Healthcare Strategy – Genome UK: The future of healthcare

The National Genomic Healthcare Strategy was commissioned by the National Genomics Board (NGB).

The National Genomics Board was established to oversee the implementation of the Chief Medical Officer's 2016 report, Generation Genome, and the genomics elements of the Life Science Sector Deal. It brings together delivery partners, patient advocates, representatives from research and industry, and civil servants. The new strategy sets out our plan to extend our leadership in the field and deliver world-leading, genomics-driven healthcare to patients.

The strategy follows the structure of 3 core pillars

- diagnosis and personalised medicine
- prevention
- research

The pillars are underpinned by 5 cross-cutting themes:

- engagement and dialogue with the public, patients and healthcare workforce

- workforce development and engagement with genomics
- delivering scaled analytics, AI-assisted informatics, and nationally coordinated approaches to data
- supporting industrial growth
- maintaining trust

About Genomics England

Genomics England works with the NHS to bring forward the use of genomic healthcare and research in Britain to help people live longer, healthier lives. Genomics is a ground-breaking area of medicine that uses our unique genetic code to help diagnose, treat and prevent illnesses. It is already being used in the fight against COVID-19.

Established in 2013, Genomics England launched the world-leading 100,000 Genomes Project with the NHS, demonstrating how genomics insights can help doctors across the NHS, and building a foundation for the future by assembling a unique dataset. The project was achieved thanks to patients and participants helping to shape it and guiding decisions on data and privacy.

Genomics England is now expanding its impact. Our next chapter involves working with patients, doctors and scientists to improve genomic testing in the NHS and help researchers access the health data and technology they need to make new medical discoveries and create more effective, targeted medicines for everybody.

About GenOMICC

GenOMICC stands for Genetics Of Mortality In Critical Care and began in 2016 as an open, global consortium of intensive care clinicians to understand genetic factors that influence outcomes in intensive care from diseases such as SARS, influenza and sepsis. When COVID-19 hit, GenOMICC was already recruiting and has now obtained DNA samples from 4,000 cases already.

The study is led by Dr Kenneth Baillie at the Roslin Institute, University of Edinburgh. Across the UK, the set-up of GenOMICC has been funded by a UK charity, Sepsis Research (FEAT), by the Intensive Care Society, and by the Wellcome Trust, UKRI(MRC) and the Chief Scientist Office.

Within the UK, GenOMICC is currently actively recruiting in 208 intensive care units, covering more than three-quarters of the ICU capacity of the nation. Together with our international partners, we aim to provide genetic evidence to help find new treatments for critically-ill patients.

Genetics gives us an extremely powerful tool to help us find new approaches to complex disease processes, but getting solid answers requires us to study very large numbers of people. Ultimately, the global GenOMICC consortium aims to obtain 100,000 DNA samples from critically-ill patients. This could have important implications for both the COVID-19 outbreak, and for critical illness in general.