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DNA tests have potential to transform next 70 years of NHS care, experts say

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Patients in Scotland could benefit from a revolution in personalised healthcare, thanks to major investments in gene sequencing technology.

Researchers say pioneering techniques that can sequence a person's entire genetic make-up in under three days have the potential to transform patient care in the coming decades.

The setting up of two cutting-edge centres for genome sequencing, in Edinburgh and Glasgow, and the contribution of NHS staff from across Scotland, have laid the foundations that will make the transformation possible.

Work carried out by the Scottish Genomes Partnership, a collaboration led by the Universities of Edinburgh, Glasgow, Aberdeen and Dundee and NHS Scotland, has given researchers unprecedented access to sequencing technologies.

Findings from the project are already helping to improve diagnoses of patients in the Scottish NHS, as well as advancing the understanding of rare and common diseases including cancer.

More than 400 NHS Scotland patients and their families have now had their entire genetic make-up decoded under the scheme. NHS Scotland Regional Genetics Services have identified sufficient patients with rare inherited conditions to allocate the remainder of the 1,000 genomes available in Scotland as part of the 100,000 Genomes Project.

Professor Tim Aitman, Director of the Centre of Genomic and Experimental Medicine at the University of Edinburgh, is Co-Chair of the Scottish Genomes Partnership.

He said: "As the NHS turns 70, it is the perfect opportunity for the Scottish Genomes Partnership to highlight its hope for the future through the successful partnership between four of Scotland's medical schools, the NHS Scotland Genetics and Laboratory services and Genomics England.

"This technology offers one of the biggest opportunities in today's NHS, delivering precise molecular information that is changing the management of diseases. It could also ultimately enable prevention of diseases. We look forward to working with participants and funders to deliver the next phase of genomic medicine to the people of Scotland."

Professor Andrew Biankin, Director of the Wolfson Wohl Cancer Research Centre at the University of Glasgow and Co-Chair of the Scottish Genomes Partnership, said: "Genomic testing allows us to start predicting which therapies will work best for an individual cancer patient, improving outcomes whilst minimising side-effects and cost. The NHS is optimally positioned to lead in the development and implementation of precision medicine strategies for cancer."

The Scottish Genomes Partnership has received funding from NHS Scotland, the Scottish Government and the UK Medical Research Council. It is collaborating with Genomics England as part of the 100,000 Genomes Project.

Lead clinician for the NHS Scotland Genetics Consortium and lead clinical geneticist for the Scottish Genomes Partnership, Professor Zosia Miedzybrodzka of the University of Aberdeen, said: "NHS Scotland scientists and clinicians will be working over the next year to turn the

complex DNA sequence data we have collected already into test results that can make a real difference to the lives of patients and their families."

Fiona Murphy, Director of the NHS National Services Division, said: "Innovation has driven huge changes in the NHS over the past 70 years with new technologies bringing benefits to all patients. Genomics will be central to future medical advances and it is fantastic to be part of the SGP leading a new wave of innovation in the NHS in Scotland."

Provided by University of Aberdeen