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**Gene testing first for warfarin patients in North West**

Health staff in Merseyside and Cheshire are using gene testing to prescribe individualised dosages of a commonly used, lifesaving drug.

Genes are part of our DNA and this testing examines specific genes which influence the body’s response to warfarin.

It is the first time genotyping by front-line staff has been used in the provision of drug dosing to patients in the UK, heralding a new era in personalised medicine.

The drug, warfarin, is a blood thinning agent which is used for the treatment of blood clots and is also used in patients with atrial fibrillation – a heart flutter which causes an irregular heartbeat and can lead to strokes.

In the UK it has been estimated that at least one per cent of the population and eight per cent of those aged over 80 years, are taking warfarin.

The problem with warfarin is that if the dosage is wrong, the risk of bleeding or a blood clot increases. Commonly, a patient will attend a clinic six to eight times before the correct dosage is established.

An international randomised control trial in Liverpool, Newcastle and Sweden included genotype testing of patients into an algorithm to calculate dosages. This proved highly accurate – and now, clinics in the Royal Liverpool University Hospital – where the clinical trial was conducted – Warrington Hospital and the Countess of Chester Hospital are genotyping new patients with atrial fibrillation before prescribing warfarin.

LGC, an international life sciences measurement and testing company, is the technology partner. Their desktop ParaDNA equipment gives a genotyping result from a simple saliva sample in 45 minutes.

This real-world testing of the use of genotyping is being monitored and evaluated, with the aim of introducing it routinely throughout the UK. It is supported with funding from the Wolfson Centre for Personalised Medicine; the CLAHRC NWC; the Innovation Agency - the Academic Health Science Network for the North West Coast; and LGC.

The work is led by Professor Sir Munir Pirmohamed of the University of Liverpool’s Wolfson Centre for Personalised Medicine, and Executive Director of Liverpool Health Partners. He said: “This is innovation and it is disruptive; it is a way of personalising care which can be replicated in many areas of medicine, creating a major paradigm shift in how we diagnose and treat people.

“This is how we get patients onto the right drugs at the right doses – using ‘precision dosing’ so that they are effective. This improves the treatment of patients and improves the efficiency of existing and new drugs.”

Dr Simon Wells, Business Unit Director for ParaDNA at LGC said: “Applying our ParaDNA genotype testing technology in this way is a milestone in patient care. A simple mouth swab provides DNA which can now be analysed by nurses in a single, easy-to-use procedure.”

Since the process was introduced in March and up to September, 61 patients have undertaken the genotype test before being prescribed warfarin.

Paul Downie, 56, of Grappenhall in Warrington was referred to the anticoagulation clinic following treatment for an irregular heart rate.

He said: “The old way of prescribing warfarin is more hit and miss; this is bespoke medication, calculated on my gene type.

“My mum went on warfarin eight months ago and she was back and forward to the clinic at least four times on a weekly basis before they got the dose right. I went back once, which meant I could go back to work quicker, feeling well enough to go back to normal life. I think this a win-win, for me and for the health service.”

Research nurses Gail Fitzgerald and Clare Prince have been involved in the randomised control trial at the Royal Liverpool and Broadgreen University Hospitals and are now supporting the training of the anticoagulation teams to implement the genotyping in Liverpool, Warrington and Chester.

Clare Prince said: “It is very exciting for us to see the translation of research into clinical practice.”

At the Countess of Chester site, the project has been co-ordinated and implemented by Lead Anticoagulant Nurse Lucy Langan and Research nurse Sammie Seagrave.

The aim is for each site to enrol 100 patients and to establish if the genotype guided dosing approach is acceptable to patients and staff; improve patient outcomes and demonstrate cost effectiveness.

Innovation Agency Chief Executive Dr Liz Mear said: “In our region we have a disproportionately high number of people suffering strokes, which is devastating to both the patients and their families.

“I hope this will be one of many projects to use genotyping to improve treatment – personalising medicine has the potential to completely transform the way we deliver health care.”

Professor Sue Hill OBE, Chief Scientific Officer for England, said: “This is precisely the sort of personalisation of treatment that we want to see available and delivered across the NHS.

“Earlier this year NHS England published its vision for [Personalised Medicine,](https://www.england.nhs.uk/wp-content/uploads/2016/09/improving-outcomes-personalised-medicine.pdf) which explained how the NHS could use these cutting-edge advances to tailor treatment to an individual’s makeup, helping to improve outcomes for our patients, and reduce pressures on the NHS by giving individuals the treatments that they will respond to sooner.”

The results of the implementation evaluation will be published after March 2017.

**Ends**

**Pic caption:** Royal Liverpool research nurse Clare Prince and Warrington Hospital specialist anticoagulant nurse Janet Dearden with Paul Downie and the genotype testing equipment

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**Notes to editors**

**‘Improving outcomes through personalised medicine – Working at the cutting edge of science’ can be found here:** [**https://www.england.nhs.uk/wp-content/uploads/2016/09/improving-outcomes-personalised-medicine.pdf**](https://www.england.nhs.uk/wp-content/uploads/2016/09/improving-outcomes-personalised-medicine.pdf)

**About the Wolfson Centre for Personalised Medicine:**

In 2007 the Wolfson Foundation awarded £2 million towards the creation of a key new pharmacogenetics research facility at the University of Liverpool. The Wolfson Centre for Personalised Medicine is accommodated in the restored Liverpool Royal Infirmary, a Grade II listed Waterhouse building, and was created to improve the efficacy rates of drugs and to reduce the number of adverse and fatal reactions currently experienced by patients.

The Centre aims to translate its laboratory findings into clinical practice, leading to novel trials, a standardising of personal medicine approaches, and benefits in patient care.

At the Centre, Professor Sir Munir Pirmohamed is leading a team of scientists, researchers and nurses in identifying genes and pathways which dictate a patient’s positive or negative response to a drug.  The multidisciplinary team collaborates with researchers locally, regionally, nationally and internationally to identify genetic predisposing factors for drug responses associated with a number of disease areas including epilepsy and asthma. Professor Sir Munir Pirmohamed is Theme Leader for Delivering Personalised Health and Care at the Collaboration for Leadership in Applied Health Research and Care (Clahrc) North West Coast.

**About LGC:**

LGC is an international life sciences measurement and testing company with a leading position in growing markets. LGC provides a range of measurement products and services which underpin the safety, health and security of the public, including reference materials and proficiency testing, genomics reagents and instrumentation, and expert sample analysis and interpretation. LGC serves customers across a number of end markets including Pharmaceuticals, Agricultural Biotechnology, Diagnostics, Food, Environment, Government and Academia.

LGC’s headquarters are in London and the company employs over 2,000 people, operating out of 22 countries worldwide. Its operations are extensively accredited to international quality standards such as ISO/IEC 17025, ISO 13485, GMP, GLP and ISO Guide 34.

With a history dating back to 1842, LGC has been home to the UK Government Chemist for more than 100 years and is the designated UK National Measurement Institute for chemical and bio measurement. LGC was privatised in 1996, and is now owned by funds affiliated with KKR.​

For more information, please visit www.lgcgroup.com

**About the Innovation Agency**

The Innovation Agency is one of 15 Academic Health Science Networks, set up by NHS England to support health systems to improve the health outcomes of their local communities. Covering Cheshire, Merseyside, Lancashire and south Cumbria, the Innovation Agency acts as a catalyst for the spread of innovation, connecting NHS, academia, local authorities, businesses and the voluntary sector to improve health and generate economic growth.

[www.innovationagencynwc.nhs.uk](http://www.innovationagencynwc.nhs.uk)