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Data analysis saves lives

Albert Einstein died from it, and a Mr R on Auckland's North Shore might well have too if it hadn't been for an innovative data analysis project conducted by Precision Driven Health - a collaboration between Orion Health, Waitemata District Health Board and Auckland University.

Mr R was one of around 800 men and women identified through data analysis of patient records as a likely candidate for Abdominal Aortic Aneurysm (AAA) during a precision screening trial involving patients at the Coast to Coast Practice near Wellsford last year.

AAA is caused by a weakness in the wall of the main artery leaving the heart. Rupture is usually sudden, unexpected and fatal. It generally strikes in the 65+ age bracket.

A simple ultrasound scan was done by the Waitemata DHB AAA screening team once Mr R was deemed to be at risk. His abdominal aorta, which should have been 2cms in diameter, was instead found to have a bulge 6 cms wide.

Surgery was performed by the Auckland Vascular Service to repair the aorta in September and Mr R is now back home – thanks to data analytics.

Dr Peter Sandiford of Waitemata DHB worked with data scientists at Orion Health and Professor Greg Jones of Otago University to develop the algorithm that helped detect Mr R's problem and put him on the path to a positive outcome.

The algorithm is based on their previous epidemiological studies that identified men and women most at risk of AAA from among thousands of patient records.

Dr Sandiford says the application of data science and machine learning, known as precision screening, has the potential to save more people like Mr R.

"AAA is the silent killer." says Dr Sandiford. "Big data makes it possible to create precise criteria to select those most at risk to AAA, and in the future to other preventable conditions."

All of the patients identified during the precision screening trial were contacted and 632 took up the offer of an ultrasound. Thirty-six, including Mr R, were found to have AAA – a prevalence rate of 5.5% - almost exactly the rate that was predicted by the data analysis.

Most were ex-smokers with histories of high blood pressure and cholesterol. The algorithm performed well – 97% of AAA were found in the 29% of patients with a predicted risk of 2% or more.

Mr R, 78, was a typical candidate.

Maori patients at the practice were not included because they had already been screened in 2015 as part of a successful Waitemata DHB-funded pilot programme that showed Māori men and women are nearly three-times more likely to have AAA than non-Māori.

The pilot was extended to all Maori living in the Waitemata and Auckland DHB catchment in mid-2017 and will conclude in March.

The precision screen trial ended in early November 2017 and the Ministry of Health's National Screening Advisory Committee is being supplied with results. Further work on IT systems and modelling will be carried out.

Orion Health Chief Executive Ian McCrae says there are also plans to develop the AAA screening tool further so it can be adopted by GP clinics throughout the country, and generalized to other medical conditions. Precision screening presents a huge opportunity for the health sector, where data science can help us to target health interventions to those with the greatest need.

The AAA project is one of three main areas of interest for PDH's Project HOPE – Health Outcome Prediction Engine. The other two are in stroke recovery and patient-reported outcomes. HOPE is one of over forty research projects supported by Precision Driven Health, applying data science to health challenges.

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About Orion Health
Orion Health (NZX:OHE) is a health technology company that provides solutions which enable healthcare technology solutions globally. Its open technology platform Orion Health Amadeus seamlessly integrates all forms of relevant data to enable population and personalised healthcare around the world. The company employs over 1200 people around the world and is committed to continual innovation, investing substantially in research and development to cement its position at the forefront of precision medicine. For more information visit www.orionhealth.com

About Precision Driven Health
Precision Driven Health is a seven-year NZ$38 million research partnership aimed at improving health outcomes through data science. It is co-founded by Orion Health, Waitemata District Health Board and the

University of Auckland. The initiative positions New Zealand at the forefront of the global transformation in healthcare known as precision medicine or personalised medicine. Precision Medicine is enabled when all information about an individual – including his or her genetic and social profile – is available as part of an electronic health record which can be accessed by clinicians in real time.

About Waitemata District Health Board

Waitemata District Health Board cares for the largest (around 615,000 people) DHB population in the country. It employs nearly 7100 staff who are all committed to preventing, ameliorating and curing ill health; promoting wellness and relieving the suffering of those entrusted to their care. Waitemata DHB has an annual operating budget of $1.65 billion. Its main sites include Waitakere Hospital, The Mason Clinic and North Shore Hospital – home to the Whenua Pupuke Waitemata Clinical Skills Centre where clinical practitioners and tertiary education researchers are united in their efforts to support the training and development of health professionals. Waitemata DHB has an organisational promise to deliver best care to every single one of its patients with a strongly-prioritised focus on enhanced patient experience and better health outcomes.