Mapping the human heart

An ingenious New Zealand development is helping doctors predict and treat cardiovascular disease.

Ten years ago they would have put you on heart drugs,” said the doctor, unwrapping his sphygmomanometer. He turned to his computer, pulled up a graph and typed in a few details – up came a flashing dot. The dot represented me, and despite my blood pressure, I was flashing away in the blue zone, the “mild risk” area of the graph.

The flashing dot was a heart-warming sight, but it was only a computer-generated graph. I thought. As the doctor then informed me, I was looking at the most sophisticated piece of software for managing cardiovascular risk in the world. It’s called PREDICT, for obvious reasons, but is officially known as a “web-based clinical decision support system”. It’s the result of decades of research led by Rod Jackson, professor of epidemiology at the University of Auckland, who has helped change the way New Zealanders are treated for heart disease.

Only a decade or so ago, the standard approach to assessing the risk of cardiovascular disease focused around a single risk factor, like blood pressure. Most doctors knew, theoretically, that things weren’t so simple, that myriad factors were involved. This had been made apparent by the Framingham Heart Study that, beginning in 1948, traced the health and lifestyle of 5200 residents of a small town in Massachusetts to find out the common factors contributing to cardiovascular disease. The study (now extended to include a second and third generation of the original cohort) helped researchers confirm that key risks were high blood pressure, along with high blood cholesterol, smoking and diabetes. These interact with each other, along with other factors such as age, sex and weight.

The study was crucial to understanding cardiovascular disease, at least at a theoretical level, but it wasn’t so useful for the average working GP. “There was a fundamental problem,” says Jackson. “How to communicate it. It wasn’t easy to consider half a dozen factors at once when making any clinical decision. It
were sent out to GPs around the country. But as it transpired, the GPs kept losing the charts. As Jackson notes, the average GP in the 1990s was flooded with paperwork and a multicoloured chart – however straightforward, however life saving – was easily lost in the deluge.

Then came computers, and Jackson and his team started working with a company called Enigma. The result (after years of work) was the aforementioned software that had my doctor bouncing in his chair with enthusiasm. Understandably, PREDICT links up with a GP’s database, so he or she needs only type in a patient’s name and it will suck up pertinent information on his or her health status. The GP might modify a few details, and up pops a graph depicting the patient’s projected risk of having a heart attack or stroke over the next five years. A couple of clicks away is advice on treatment, based on national guidelines. (Medical intervention is recommended if the risk is somewhere between the yellow (“high risk”) and orange (“very high risk”) zones. The GP can then show you what will happen to your trajectory if, say, you give up smoking.

What makes PREDICT even more ingenious is that every time a GP uses it, the risk factor data is collected on a secure website (encrypted to ensure complete anonymity). Jackson and his colleagues are combing that data with other data related to cardiovascular disease: drug treatment, hospitalisations, deaths and so on. In other words, PREDICT is a tool that helps GPs predict and treat cardiovascular disease, but also generates data that will be used to create an even more sophisticated tool to predict and treat cardiovascular disease, specifically for New Zealanders.

This is significant. Any prediction of cardiovascular disease is mostly based on data from the Framingham study, based on 5000 middle-class Caucasian Americans. PREDICT currently has the cardiovascular risk profiles of 150,000 New Zealanders. Jackson: “We want to develop a Vascular Atlas of New Zealand.” My doctor, clearly a fan, says, “It’s Framingham on steroids.”