A biobank of samples from 500,000 people and stored for years is a boon for medicine, writes Tom Whipple

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teen years before scientists found — in news announced this week — a protein signature that predicted if you would get dementia, John, a 60-year-old civil engineer, popped across the road from work to have his blood taken. He had seen there was a new medical study and thought: “Why not?”

Today that blood is stored in a freezer alongside ten million other samples from 500,000 people. But John’s contribution to science is not over. Still in fine fettle, and now retired, he finds himself in an industrial estate outside Reading, just behind Ikea, having his brain scanned. He is the 16,350th person to do so at this site alone.

And if he is a little creakier than he was in the late Noughties? Well, the study he joined that day 15 years ago, one of the most ambitious in medical history, is reaching the prime of its life.

Professor Naomi Allen, chief scientist of the project, says: “The reason why is precisely because its participants are no longer in their prime. “We have thousands of people with breast cancer, with heart disease, the most common diseases,” she says, bouncily.

Two decades after it began, the UK Biobank is approaching maturity. Run in partnership with the Medical Research Council and the Wellcome Trust among others, it was set up with a bold goal: to recruit half a million middle-aged Britons and find out as much as possible about their health.

Everything has been done on a scale.

When its founders said they aspired to sequence all 500,000 genomes, it was at a time when the cost would have comfortably exceeded the GDP of most countries. Today they have achieved it.

When they decided to do full medical imaging on a subset of participants, including John, they said they would do 100,000.

“People thought we had an extra zero by mistake,” Allen says. Operating costs thus far are believed to be around £500 million.

The pilot imaging study, on 5,000 people, itself broke records. Imaging has now been carried out on up to 83,000 people.

The scale was the point. They wanted to know everything. They wanted to find out all they could about them, to watch as they aged — and in doing so, find out what makes us well and what makes us ill. They wanted to follow people from health into sickness.

Now, sickness has indeed started to arrive. This week a paper was published, one of 10,000 using Biobank data, that identified the protein signatures of the earliest stages of Alzheimer’s, potentially helping doctors to catch it before symptoms arrive.

That, says Allen, is just the start. It’s only going to get better, from an epidemiological perspective. “Over the next 15 years we’re in this golden age where we’ll get thousands of new cases of dementia, arthritis, cataracts, all the things that are going to hobble us as we get older.”

She and her colleagues have, she says, been waiting for this moment— even if the participants have not: “We are just at the right time when we have enough power to start making really robust scientific discoveries.”

In a UK Biobank centre in Cheadle, Greater Manchester, there is a freezer. It is minus 80°C, and big — big enough to park two double-decker buses inside it. It contains ten million biological samples, including blood, urine and saliva taken from participants. Posed at its entrance, awaiting requests, is a guardian — a robot that can pull samples from 500,000 people. But it was convenient. It was across the road from his work in Croydon. Today his visit — at which he will have a full body MRI and a bone density scan — was far from convenient. He had to get up at 5.30am to drive there and then spend four hours in a medical gown in a windowless warehouse. All he has received in return was the offer of a sandwich and a biscuit (there is also fruit, Joanne Gunner, the imaging operations manager, explains, but — alas — despite the ostensible purpose of the study it is not popular), and a tour of the dual carriage ways of Reading.

“What’s remarkable is there’s absolutely nothing in it for them,” says Allen, who joined ten years ago.

“There’s no feedback of results. They’re doing it out of the goodness of their hearts. You have to wonder for the hope for future generations.”

Although, John has a different way of putting it. “It has been an adventure. It’s been another experience,” he says.

Now the adventure, for the study itself, is just beginning.

Biological samples from the past 15 years are in a freezer in Greater Manchester. A robot, below, pulls them out for scientists to arrive. This week a paper was published, one of 10,000 using Biobank data, that identified the protein signatures of the earliest stages of Alzheimer’s, potentially helping doctors to catch it before symptoms arrive.

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