NAVIGATING A GALAXY OF DATA

Following on from the publication of a new *National Genomic Healthcare Strategy*, we talk to Chris Wigley, Chief Executive of Genomics England.

The discipline of genomics, like so many others under the banner of biochemical science, has had a lively 2020. In responding to the COVID pandemic, genomic scientists have played their part in identifying a number of genetic markers that could leave certain groups of people more susceptible than others to contracting the SARS-CoV-2 virus and to suffering severe, potentially deadly symptoms.

But the really big news for genomics came at the end of September with the publication of the government's National Genomic Healthcare Strategy. "Genomics has the potential to transform the future of healthcare," said Secretary of State for Health and Social Care, Matt Hancock, "offering patients the very best predictive, preventative and personalised care. The UK is already recognised around the world as a global leader in genomics."

At the heart of the strategy is Genomics England, set up in 2013 under the watch of former Prime Minister David Cameron and wholly owned by the Department of Health and Social Care. Chief Executive Chris Wigley says the initial priority was to start putting together large datasets of whole genomes, particularly in relation to the 100,000 Genomes Project to sequence the genomes of NHS patients.

"This was in order to then build the models and derive the insights that would lead to healthcare applications. That initial focus on the 100,000 Genomes Project was completed at the level of sequencing and analytics in 2018. So what we now focus on is two key services. One is healthcare, in partnership with the NHS, where we provide what you might call a sample-to-answer diagnostic service for whole-genome sequencing, primarily for patients with rare diseases or cancer. That will soon be available. The second service we provide is to the research community, so biotech, biopharma and academia. That's around what we call the data-to-insight service. We de-identify all the genomic data and clinical data from the healthcare work and make it available to researchers in a secure environment. We have over 3500 researchers registered who are doing that work."

Next steps

The publication of the strategy now sets out the next step forward for Genomics England. "There is a view that 10 years ago genomics over-promised and under-delivered in terms of serving mainstream healthcare," says Wigley. "But I think that where we are now is an exciting point. Rare disease and cancer gets a lot of attention in the strategy for the right reasons, and we're at the point where we can use genomics to deliver diagnoses and prognoses. At the same time, we can start looking at more common diseases, such as cardiovascular, diabetes and musculoskeletal conditions."

This will involve further work on developing approaches such as polygenic risk scoring and functional genomics – in fact, everything from foundational science to clinical care. "That's what's so exciting about it," says Wigley. "We have the university and biopharma sectors doing such impressive research, and then we have a direct line into healthcare delivery via the partnership with the NHS. That puts us in a unique position globally."

Like so many other scientific institutions, the work of Genomics England was interrupted and diverted by the COVID pandemic. Back in April, it set up a programme in partnership with the University of Edinburgh to sequence the genomes of people who have had severe COVID symptoms and those who have been asymptomatic in order to identify biomarkers that might help with clinical treatment, target discovery for therapeutics or vaccine development. "That's been a big project for us," says Wigley. "Some of the first insights coming out of that point to seven locations on the genome that are associated with responding severely to COVID, three of which already have potential therapeutics associated with them for other reasons. We're hoping that will feed into clinical trials, and can potentially help to identify either existing or novel treatments for people who are most severely affected."

New insights

COVID aside, and now with the national genomics strategy set out in black and white, where does he see the discipline heading over the next few years? "That's a big question. I hope we can keep bringing innovative approaches and techniques into the mainstream, where we can use genomic science to make a real difference to the health of as many people as possible. That is the ultimate goal. A central element of that is how we maintain and build on the trust and engagement of patients, research participants and the general public, and how that relates to issues like data protection and privacy and the appropriate use of these datasets.

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CHRIS WIGLEY

- ✔ Master's degree from the University of Edinburgh
- ✔ Established and led analytical work at the counter terrorism policy department, UK Foreign Office
- ✔ Partner at McKinsey working on technology strategy
- ✔ Chief operating officer at QuantumBlack, an AI tech company
- ✔ Appointed Chief Executive Officer at Genomics England in October 2019

"We also have a lot of work do in linking disparate datasets, for example, on sociodemographic data, so that we can make it easier for researchers to find new insights. A lot of great work is already being done in trying to link lots of legacy systems and to get to the point where we have a national spine of data. That would help us tackle the sort of questions that have become acute during COVID around the impact that sociodemographic or environmental factors have on the likelihood of people contracting diseases and how that relates to health data."

This is vital if genomics is to be seen as more than just another grand science project. The clear intent of the strategy is to create a much closer working relationship between the science and mainstream clinical practice, and to this end the support of the NHS, academic researchers and bio companies has been crucial. "All the type of groups represented on the National Genomics Board," says Wigley. "It's a community strategy. Now we can start looking at this whole galaxy of data that we need to navigate in the right way if we are to get the most out of genomic science. If we just look at the genome, we're only seeing part of the story." TBS