BIOMEDICAL RESEARCH

Huge US government study will offer genetic counselling

The National Institutes of Health has hired a firm to help participants cope with results.

BY JONATHAN LAMBERT

HYDROMET/GETTY

Researchers running a genetic-sequencing project in the United States aim to recruit one million people.

A US government project that aims to sequence the genomes of one million volunteers will partner with a genetic-counselling company to help participants understand their results. It will be the largest US government study to provide such a service.

The National Institutes of Health (NIH) in Bethesda, Maryland, is leading the project, called All of Us. And on 21 August, the agency announced the award of a US$4.6-million, 5-year grant to Color.

The firm, in Burlingame, California, will counsel every study participant with a genetic variant that could have serious health implications — such as *BRCA* mutations associated with breast cancer — when they receive their results. Color will also develop educational materials for all study participants, and will offer telephone consultations to those who wish to discuss their results with a counsellor.

"This is a really responsible and more equitable way of communicating the results of research to all participants," says Bartha Knoppers, the director of the Centre of Genomics and Policy at McGill University in Montreal, Canada. "They're laying the foundations for building good bridges between the findings and the people."

The All of Us study, which launched in May 2018, aims to enrol at least one million people. Participants will be asked to provide a host of health information, including electronic health records, genomic data and blood and urine samples. Study researchers also plan to collect data recorded by personal activity trackers, such as those found on smartphones. They will store the information in an online database that outside scientists can access with permission from the programme.

Enrolling participants from ethnic and socio-economic groups that are typically under-represented in biomedical research is a priority for the study's organizers. Most genomic research until now has been conducted on non-Hispanic white people. One recent review found that as of 2018, 78% of people included in genomic studies of disease were of European descent (G. Sirugo *et al. Cell* **177**, 26–31; 2019). That bias narrows the applicability of conclusions from genetic-testing studies, and can lead to misleading or dangerous interpretations of genetic variants found in other populations.

The All of Us study has enrolled 175,000 people around the United States so far. About 50% are people of colour, and 80% are from groups that have historically been under-represented in biomedical research. The study's scientists have yet to sequence any genomes, but they hope to provide participants with results in the first half of 2020, says Stephanie Devaney, the deputy director of All of Us.

To generate the kind of long-term data set necessary for breakthroughs in precision medicine — which uses genomic, physiological and other data to tailor treatments to individuals — All of Us must retain these participants, ideally throughout their lives. That's where genetic counselling comes in.

"It's imperative to our mission that we return value to our participants, that we communicate back the results of [our] research," says Devaney.

WORKING OUT THE DETAILS

This is a step in the right direction, says Amy McGuire, a bioethicist at Baylor College of Medicine in Houston, Texas. But "the devil is in the details", she adds.

And Devaney and her colleagues need to work out a lot of details — including what the programme will tell participants about their own genomes, and how. A genetic counsellor will give people information on genetic variants that have clear, actionable consequences for health, such as those in the *BRCA* gene. But study organizers are still discussing how much to tell participants about genetic variants that don't have such an explicit link to illness.

Their task is complicated by the fact that knowledge about genetic variants can change over time. A mutation that researchers now think is benign could one day be considered an indication of increased cancer risk. All of Us participants are told that the implications of their genetic-test results could change as scientists learn more about certain mutations, says Brad Ozenberger, genomics programme director at All of Us. But he and his colleagues are still working out how frequently to notify participants of such developments.

The effects of a genetic variant can also depend on ethnicity. Certain genetic tests that physicians use to help determine whether someone with cancer should undergo chemotherapy have been tested only in white Europeans. It's unclear whether these are accurate for people of colour. All of Us and Color say that they are working out the best way to communicate such uncertainties to study participants.

But the company says that it's prepared to have those conversations. "We've worked with a lot of diverse communities," says Alicia Zhou, vice-president of research and scientific affairs at Color. These include technology and manufacturing companies, railway workers in Alaska and residents of Trinidad and Tobago, she adds. ■