Will UK Biobank pay off?

UK Biobank has been promised £61m funding to collect data about genetic and environmental factors that affect human health and disease. But how exactly these data will be exploited is still uncertain, as **Geoff Watts** reports

Although the funders of biomedical research are occasionally prepared to undertake modest acts of faith, the promise of a wholly immodest £61m (€88; $111m) points to belief verging on certainty. The funders in this case are the Wellcome Trust, the Medical Research Council, and the Department of Health. And the fortunate recipient of their largesse is UK Biobank. Launched in March, this ambitious project continues to generate controversy.

Previous prospective studies of health and disease have been designed to assess the contributions of environment, behaviour, and family history. But from the outset UK Biobank was to be different—more subjects, more conditions, and an intention to exploit recent insights into the human genome.

Commentators agree that the United Kingdom, with its vast pool of accessible health service records, is the ideal setting for such a study. UK Biobank will recruit and follow up 500 000 people aged 40-69 through their routine contact with the NHS. This will limit volunteers' active participation to a single hour long assessment in which they'll be measured, give blood and urine samples, and answer questions about the way they live. Only if the organisers need further information will they return to individual volunteers.

Recruitment has started, so far confined to one assessment centre at Altrincham in Cheshire. UK Biobank's principal investigator, Professor Rory Collins, says that the procedure is still being "tweaked." Not until it's running smoothly will the funding consortium release the cash. Assuming it does, nationwide collection of data will begin. Six to 10 centres will operate at any one time, and UK Biobank will then receive and process about 1000 samples a day. Eventually it will have to store and track and be able to retrieve some 10 million.

Part of the fascination of the project—and one reason why it's an act of faith—is that no one can predict how future researchers may wish to exploit it. Some issues are obvious enough—the interplay of heredity and environment in the cause of cardiovascular disease and cancer, for example. But the stored samples and accumulating data may have the potential to answer questions that no one has yet thought to ask.

From its beginnings in the 1990s, UK Biobank has lacked neither supporters nor critics. One supporter was the late Sir Richard Doll. As far back as 1954, he'd used the paper that launched his classic study of smoking and doctors to make the case for prospective epidemiology (*BMJ* 1954;1:1451-5).

The House of Lords Select Committee on Science and Technology has also backed UK Biobank: "We applaud the efforts to… establish a large national cohort to study the interaction of genetic and lifestyle factors," said the 2001 report *Human Genetic Databases: Challenges and Opportunities.*

Ian Gibson MP, former chairman of that committee's counterpart in the House of Commons, was originally more cautious. Speaking in 2002, he said, "Sampling adults and using their genetic information vis à vis their patchy recollections of past behaviour and exposure to environmental risks will make it difficult to disentangle genetic and environmental factors… I think it will skew towards overemphasising the genetic influence on disease processes." The evolution of the project since that time seems to have allayed his fears. "Now I am very confident that it will succeed and be an extraordinarily valuable resource for public health in the UK," he commented at the time of UK Biobank's official launch. "It has my full backing."

Other critics have yet to be persuaded. In a briefing paper issued in 2001, the genetic technology pressure group, GeneWatch UK, queried what it saw as potential problems over data quality, commercially driven research agendas, and an overemphasis on biological factors in the origins of disease.

Dr Helen Wallace, GeneWatch UK's deputy director, still maintains that the project is based on an erroneous view of the role of genes in disease. "If they're trying to detect the interaction between a single gene and a single environmental factor then, yes, it could work. In practice the role of genes is more complex than that."

Several other critics have also pointed to what they see as an obsession with genetics. Professor Collins believes this is more a question of perception than reality. "UK Biobank has always been a large scale epidemiological study that wanted to look at, yes, genes—but also a wide range of other factors. It's the latter that have actually absorbed much of the preparatory effort. The DNA part has been the easy bit."

When UK Biobank was first mooted it was referred to as the "UK population biomedical collection." The snappier title is not the only change. Public and professional consultation led to the creation of a comprehensive ethics and governance framework. And thoughts of feeding health information back to individuals were soon replaced with the more realistic intention to keep the group as a whole informed of progress.

Barring unforeseen disaster in the collection of data, chances are we'll hear relatively little from UK Biobank over the next few years. Only if nothing much of interest has begun to emerge during the next decade will whoever holds the reins have to face uncomfortable scrutiny. □

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