

Genetic Databases

Can medical records make a healthier Britain?

Martin Ince, science journalist

THE OPINION POLLS are unanimous – the National Health Service is the UK's best-loved institution. And in its seventh decade, new technology may soon allow the NHS to move beyond being a provider of health care and turn it into a globally important source of knowledge on health risks and opportunities.

This possibility comes about because the NHS is the world's single biggest health provider. In England alone, it looks after more than 50 million people, while across the UK it has over 60 million patients. This means that it is an information resource of global importance about the incidence of disease and ill health, and of the effectiveness of interventions against them.

As the UK's biggest collector of social science data, the ESRC has a lively interest in the opportunity that this use of health information may open up. Medical records may be used alongside social science data, perhaps on incomes or family size, to produce deep insights into the health inequalities that affect both the UK and other countries.

The Centre for Social and Economic Research on Innovation in Genomics (Innogen), which focuses on new biological technology, is already looking at some of the key issues that medical and genetic databases create. The main one is consent. When we tell the doctor about our ailments, we may not expect the information we reveal to go any further. Things get even trickier when the information forms part of a 'linked' record, which could contain genetic as well as medical information, or material on our family medical history as well as our own. Linkage is vital if we are to get deep insights into the causes and cures of major medical problems.

Innogen has been looking at deeper ways of engaging the public in this research in the context of Generation Scotland, a plan to gather medical and genetic data on 50,000 of ▶

SCIENCE GENETIC DATABASES

► Scotland's five million people. Their work has involved engaging with patient groups and others as well as the general public.

Icelandic lesson

The tale of the deCODE database is a revealing one. Set up in Iceland to track the entire population's medical and genetic history, it has been only a limited success, mainly because it failed to get informed consent from the people on whom it held data. Consent was assumed unless Icelanders opted out. Neither academic researchers nor the pharmaceutical industry now regard this level of consent as adequate.

People are especially sensitive about medical data on topics such as sexual or mental health, and they are likely to be uneasy about information being available to a company – for example for use in drug development – rather than to a doctor or other medical practitioner. Innogen's work shows that people are also concerned about how long consent lasts and what happens if it is withdrawn. How does someone know that their tissue samples have been destroyed and their records erased?

These reservations suggest that the NHS cannot assemble a UK-wide system of linked medical records overnight. Speakers at a 2007 Wellcome Trust meeting on the research use of medical records pointed instead to a number of places in the UK, including the Wirral and parts of Wales, as well as Scotland, where research and health gains are already emerging from linked data on patients whose active consent to their medical records being used in research is routinely sought.

The integrated use of genetic and health information is now stepping up to a new level with UK Biobank, which will gather health and lifestyle data as well as biological samples from 500,000

people. In time, these and other databases may be federated to create a virtual national system.

It turns out that patients to whom the benefits of allowing their records to be used in research have been explained clearly almost always agree to it. The benefits could be to them personally. A diabetic has everything to gain from better diabetes treatment. But people are well-disposed to medical research – think of all the fundraising they do to pay for it. They are likely to consent on general principle if they feel their data will be secure.

Despite some high-profile mishaps, the new IT systems now being developed for the NHS offer the scope for patterns of disease and ill health to be tracked on a national scale. This kind of activity is referred to as 'secondary' use in NHS circles, where IT is understandably regarded as an aid to service delivery. But research is one of the original stated aims of the NHS and linked medical records will encourage it.

Success stories

The Wellcome conference heard that there are already success stories from the use of linked medical records in the UK. In research, they have been used to uncover a multi-gene predisposition to obesity. If you have this array of genes, you need to watch what you eat. But policymakers must accept that there are people who are likely to stay fat even with more exercise and fewer biscuits.

As for improving treatment, linked data provides some of the most powerful tools against the current epidemic of diabetes. In the north west of England, databases on diabetes link everything from GPs' notes to retinal scans. It is such a powerful tool that specialists in other diseases are calling for something similar, and it is available to researchers as well as practitioners.

People are concerned about how long consent lasts and what happens if it is withdrawn. How do you know if your tissue sample has been destroyed and your records erased?



It would be wrong to think that the UK has this field to itself. Denmark has a federated set of medical databases that covers its 5.4 million population. Its system is so good that a *Science* magazine article in 2000 said that the entire country had become a research cohort.

Several innovations are needed if the UK is to make the most of its strong position in medical data linkage. The main one is to apply a single NHS number to every health intervention anyone in the UK undergoes, from a heart transplant to a visit to the optician. This should be allocated as soon as someone comes into contact with the NHS, even if they are not born yet. And for completeness, it should cover treatment outside the NHS.

This challenge is already being met in Scotland, where there has been a publicity campaign to get people to remember their NHS number. But those Danes are ahead of us. Most people there have a single number that they use everywhere from the hospital to the bank and in dealing with public and private sector organisations.

This suggests that the task for UK health research is about people, not computers. British people have too little trust in companies and governments to use a single number for all their important life transactions. So how can we ensure that as much medical data as possible is made



Several innovations are needed if the UK is to make the most of its strong market position in medical data linkage

available for general research use? There are already some GP practices that participate in research. My own is one, and I have participated in a study that produced over 30 papers in the scientific literature.

But if more people are to give their informed consent for their medical data to be used in large-scale statistical studies that they may never know about, the benefits to them and to society will need to be explained before they sign up. This will take time, something doctors insist they have far too little of.

Perhaps one good move would be an agreed declaration about what happens to patient data once it goes into a national system, whether for research, management or practice use. The top line should

The evidence suggests that patients would be a lot happier about having their medical data recorded if it were made clear to them exactly how this information may be used.

be that nobody unknown to the patient will know whose data they are looking at. Only a nurse, GP, specialist or other individual with a direct patient-practitioner relationship can see the name that goes with the number. On the other side of the equation, the patient should be clear that their anonymous data is, to some degree, an NHS asset that will be used for public benefit.

Not everyone will buy into this bargain, but experience in France suggests that only a few per cent of people refuse to allow their anonymised data to be used if they get a proper explanation of what will happen to it.

There are bound to be complications. There is already unease about the way in which millions of British people's DNA is available to the police, as there is about identity cards, CCTV and other forms of surveillance. The government could help by making it clear that NHS data will never be available for law enforcement.

But people are getting more used to the idea that they live in a world rich in networked data of all kinds. Some of the biggest health benefits from data linkage may come from adding non-medical data on incomes, housing, air quality and even the weather to the information gathered by the NHS. I for one would love to know whether it is the rain, rather than the diet, that shortens lives in some of our northern cities. ■

<http://www.innogen.ac.uk>



Brain scan to lesson plan?

NEUROSCIENCE CAN HELP EXPLAIN HOW LEARNING OCCURS

PROFESSOR
ANDREW POLLARD,
Director, ESRC
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Learning Research
Programme



THE BRAIN IS THE ORGAN that is responsible for learning, so anyone involved with education should wonder how it works. Now for the first time, developments in neuroscience are bringing us closer to a clear idea of how learning occurs. In the process they are shedding a sceptical light on some supposedly scientific ways of improving school performance.

We know that the brain consists of about 100 billion interconnected brain cells or neurons, and that there are many trillions of networks into which they can be combined. At the same time, advances in brain imaging mean that we know far more about which parts of the brain are responsible for learning. For example, a structure called the hippocampus has an important role in consolidating new memories. But we also realise increasingly that many mental activities involve a wide range of brain areas. There is little point in trying to enhance the performance of a specific brain component in the hope of enhancing learning or some other skill.

When should learning begin?

Neuroscience has already shown that pushy parents can relax. There is no convincing argument for formal learning to begin at the earliest possible age. The human brain goes on developing new connections into adolescence and puberty, something that sets us apart from our near relations among the primates. Even more strikingly, it has become apparent that the teenage brain is subject to radical reorganisation that limits abilities such as planning, directing attention or avoiding inappropriate behaviour, something that parents and teachers have

Our growing knowledge of the human genome may allow us to tailor smart pills to individuals

always appreciated instinctively. Brain structure can change even in adults, encouraging news for proponents of lifelong learning.

It seems likely, too, that the idea of critical periods in life for acquiring skills such as language learning is overstated. People can learn at any time, although there may be sensitive periods when it is easier for the brain to manage specific types of learning.

Brain maintenance

The research seems to show that having a sensible balanced diet, sleeping enough and not being dehydrated are helpful to brain performance. But although being dehydrated is bad for mental processes, children know when they need to drink, unless it is very hot or they are doing severe exercise. Having water available is more important than trying to persuade children to drink it. The evidence is less clear on other supposed ways of

enhancing the brain, such as the fatty acid supplement Omega 3. Despite the many products on supermarket shelves claiming to include Omega 3 to benefit the growing brain, there have been few proper tests of its effect. But there is increasing evidence that Omega 3 may help brain function in childhood, and reduce the risk of dementia in later life.

The picture is clearer when it comes to caffeine, the only psychoactive substance (apart from sugar) that can legally be sold to children. Children who drink a lot of cola need a further dose of caffeine to get back even temporarily to the baseline performance of others who drink cola only in moderation.

Improved learning

Our growing knowledge of how the brain acts during learning raises doubts about many commercial programmes that claim to enhance learning on some sort of 'brain basis'. Many stress the difference between left brain and right brain processes, the former being characterised as more logical and the latter as more artistic. Except for a minority of people with severe neurological problems, the brain is well able to sort out where to carry out a specific activity and there is little point teachers worrying about it. Much the same applies to attempts to classify children's 'learning styles', for example into visual, auditory or kinesthetic. This seems not to work. It is probably preferable for all children to be presented with as wide a range of learning materials and experiences as possible.

Over the horizon

Much has been said about the possibility of 'smart pills,' more formally cognition enhancers. Ritalin, intended for children with attention deficit problems, is already used in the hope of aiding the concentration of children with no proven deficit. Donepezil was developed for people suffering from Alzheimer's disease but has a demonstrable positive effect on the memory of people with normal brain function. Our growing knowledge of the human genome may allow us to tailor smart pills to individuals rather than assuming one pill will enhance everyone's brain in the same way.

There will be rising pressure on students of all ages, and on employees, to use such pills. Once people are taking pills because of work culture rather than club culture, ethical issues proliferate. What about the value of a qualification obtained while on drugs? Should students be thrown out of school for taking Smart Pills? Or for failing to take them? Their potential availability creates a new moral landscape for teachers, parents, and learners of all ages. ■

<http://www.tlrp.org/pub/commentaries>



THE
LOWDOWN

Stem cells

When the smallest things create the biggest controversies... Stem cell research de-mystified

DR CHRISTINE HAUSKELLER talks to Ginny Russell and answers questions on stem cells

What is a stem cell?

A stem cell is a cell that is able to divide itself either into two cells identical to the original or into cells more differentiated than itself. Normal cells can only divide into cells that are identical to themselves. An embryonic stem cell can become any one of about 200 types of cells that make up the human body. As an embryo develops, stem cells differentiate into an increasingly complex range of different cells that take on functions in systems, such as the liver, the brain, the skin, or the blood.

What are they used for and what can they cure?

Stem cells work naturally to regenerate the body's tissues, keeping the body alive. For example, they are active in the re-creation of skin after a cut. Stem cell science aims to manipulate this regenerative ability to cure diseases for which there are no good therapies at the moment. Repair of the infarcted heart, degenerative brain or liver disease and diabetes are the main targets for stem cell therapies. But at the moment, stem cell medicine is fairly restricted in its scope, mainly to cancer therapy and more recently the repair of skin wounds.

How does it work?

Today's therapies do not use embryonic stem cells. They depend on organ-specific stem cells, often taken from the patient. The cells are usually selected out from a bone marrow donation and are supplemented with specific agents to increase their proliferation rate. After this they are injected into or applied to the tissue to be cured. Here they are expected to produce many healthy cells to replace the damaged cells and reconstitute the affected organ's ability to function.

DR CHRISTINE HAUSKELLER,
Senior Research
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Centre for
Genomics in
Society



Is there a lot of money going into research?

In the UK, millions of pounds have been invested in advanced forms of stem cell research. But so far, the outlook for off-the-shelf treatments for widespread diseases is disappointing.

Why has so much money has gone into it?

The UK government has concentrated on the speculative route of developing embryonic stem cell therapies. Success would mean a major new biomedical resource, and enormous income from patented cell therapies. But this focus on potential big-impact therapies is a long way from the natural process that the cells are supposed to be imitating. It involves a lot of artificial interference with cells from embryos.

Why is stem cell research controversial?

This approach to developing mass treatments of disease depends upon using stem cells that do not trigger any adverse rejection reactions in the person who is receiving them.

Embryonic stem cells are supposedly unspecific enough to be able to achieve this, but in order to retrieve them one has to remove the inner cell mass of very young human embryos. And human embryos are not an easily available commodity or resource. Many people believe that the moral status of human life should prevent anybody from using human embryos for medical research.

What do you hope to achieve?

I want to come to understand the relationship that exists between science and society and the shifts in hype and hope between different scientific areas over time. ■

<http://www.centres.ex.ac.uk/egenis>

THE FUTURE OF AGEING RESEARCH

How can we improve life for the elderly?

LIKE EVERY OTHER country in the developed world, Britain has an ageing population. But according to Professor Alan Walker, Britain is doing more than most about it, by seeking the best research-based evidence on making the most of an older society. Professor Walker is a professor of both social policy and social gerontology, the study of ageing societies. But despite his intellectual background he is the first to agree that ageing is too complex an issue for social scientists to have all the answers. Hence the New Dynamics of Ageing Programme, a research initiative running until 2012. Uniquely, it combines the expertise of no fewer than five of the UK's seven research councils. As well as the ESRC, it involves the Biotechnology and Biological Sciences Research Council, the Medical Research Council, the Arts and Humanities Research Council and the Engineering and Physical Sciences Research Council.

Professor Walker says: "The research councils have realised that ageing is a huge subject that needs input from all directions, everything from basic biology to the arts, if we are to get the right answers. There is plenty of ageing research going on around the world – in the United States, the National Institute on Ageing has existed for 30 years. But although it has social scientists, it is really oriented

The trick is to make the transition to an older society as painless as possible, which calls for new social and scientific tools

towards medicine and health care. It does not get involved in engineering or the arts and humanities. That is the unique aspect of what we are doing."

He explains that to get funding from this programme, scientists will have to produce a multidisciplinary proposal that ranges across at least two research councils. As he puts it: "We hope to produce research with far-reaching effects. If a researcher wants to go on being an engineer or a biologist, they can. If they see the scope for multidisciplinary research, this is one avenue they can explore."

Sounder sleep

One of the first projects to be supported is the aptly-named Somnia. Based at the University of Surrey but involving researchers at several universities, it is looking at the key issue of sleep disorders among



To make the most of an ageing society everybody needs to be pulling together.

the old. Sleep is obviously a biological phenomenon, and drugs are under development to help ease sleep disorders, so the project will need a biological and pharmaceutical element. But it also has social aspects in terms of older people's ways of life. In addition, engineering and information technology could provide assistive technology to promote sleep.

Somnia is one of two major projects, the second is led by the London School of Economics and is examining the resources available for our ageing society. This means both financial resources, including pensions, and human ones, such as care, and will involve inputs from both the social sciences and the health arena.

It is not always easy for scientists from differing subjects to work together. That is why the Programme has funded 11 preparatory networks in which researchers can build an application for significant funding. True multidisciplinary research is always a challenge for scientists. It has also supported ten small multidisciplinary projects, and is having a second funding round to allow more big projects on the scale of Somnia to be supported. By the end of the Programme, up to 30 projects will have been funded.

Appliance of science

Professor Walker has already had some surprises. "I would not have predicted that sleep would be a major issue we would get involved with," he says, "but it was a very high-quality application and it

AT A GLANCE

Britain has an ageing population and to make the most of our older society and to improve quality of life we need to study a wide range of issues – from changing technological, cultural, social and physical environments.

IS ETHICAL CONTROVERSY COSTING LIVES?

THERE IS A CRITICAL mismatch between the demand and supply of human organs and tissues for transplantation in Britain. UK Transplant reports that there were 7,723 people on the national organ transplant list in 2007, up from 6,698 in 2006. In 2005/06, 483 people on the list died before an organ became available. The shortage of organs for transplant has produced a lively ethical debate. Over the past four decades opinion in politics and academia has polarised over several dramatic issues surrounding organ donation and transplantation.

Most recently, the Chief Medical Officer, Sir Liam Donaldson, has called for a change in the law in England and Wales, even though the Human Tissue Act 2004 has been in force for barely a year. He has suggested a switch from the current 'opt in' system to one based on 'opting out'. This would mean that consent was presumed: a person's organs would be available for transplantation after death unless they had registered an objection.

All too often, academic and political debate is consumed by the philosophical niceties of commodification, or presumed consent versus explicit consent. Adequate consideration of the practical measures needed to encourage donation is missing.

Proposals to move to a legal framework based on presumed consent are not new. But if this were introduced, its success will not hinge on a change in the law but on adequately addressing practical barriers to donation. Spanish law operates on a system of presumed consent, but in practice organs are never taken against the wishes of the deceased's family. Yet in Spain, there are nearly three times as many organ donors per capita as in the UK. This is due to the infrastructure and practical measures put in place to underpin the system, including an organised and active network of transplant co-ordinators, continuous training of the professionals involved, a high number of intensive care beds, and a process of continuous audit.

So while theoretical debate over the best ways to increase the supply of organs might keep the politicians and ethicists occupied, it is unlikely to save lives without practical measures and funding that can deliver results. ■

Dr Muireann Quigley, Dr Anne-Marree Farrell and Professor Margaret Brazier
<http://www.law.manchester.ac.uk/aboutus/news/seminars/transplant-seminars/index.html>



was about a subject where research evidence might produce definite improvements for older people."

Professor Walker is adamant that the Programme is not the place for researchers who want to write beautiful but unread papers in journals. The challenge is not science for its own sake, but policies, products and practices. He says: "There are fundamental scientific questions about why we age, and why we age the way we do. But we want to answer them in ways that will allow us to improve the quality of later life. For example, the Somnia project may lead to new technology, such as better beds or lighting. It may also have lessons for social services and the NHS. And it could point the way to new and more appropriate pharmaceutical interventions for sleeplessness."

The Programme will help society get over the idea that the old are a 'burden'. Society is certain to age. Death rates are falling, fewer babies are being born, and the big post-war 'baby boomer' generation is getting old. We also know exactly how big the problem is. The old people Britain will have 30 years from now are living today and can be counted.

The trick is to make the transition to an older society as painless as possible, which calls for new social and scientific tools. As Professor Walker says: "Ageing is often seen as a problem, but don't forget that there are big new markets here. So there are bound to be opportunities as well as challenges." ■

<http://newdynamics.group.shef.ac.uk>

AT A GLANCE

While we all argue about the ethical issues surrounding organ transplant donations, people are dying. Can we learn from the Spanish model, where there are three times as many organ donors per capita as we have in the UK?

Increase in number of people on the national organ transplant list
15%

Number of people who died before an organ became available
483



THE COLOUR OF OUR SKINS

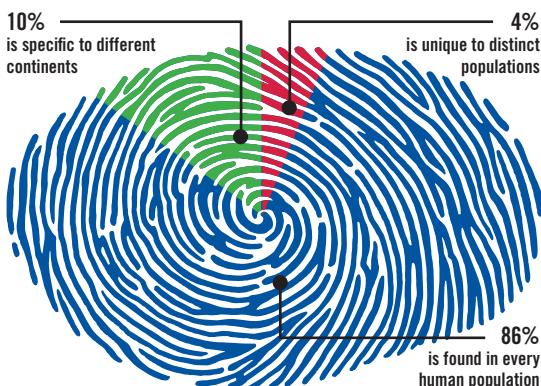
Should our skin colour dictate the drugs in our medicine cabinet?

In July 2007, Raj Bhopal, Professor of Public Health in the University of Edinburgh Medical School, made headlines with claims that Scots of Asian descent have a higher risk of heart disease than white Scottish people. In the same month, scientists in the United States published an article in the journal *Neurology* about different disease progression observed in African Americans and Caucasian Americans with multiple sclerosis.

But linking race to medicine is controversial. Professor Joseph Graves at North Carolina A&T State University is a noted critic of 'racial' medicine. He says that for racial medicine to be accurate, it needs to be rooted in biology. In most species, races or sub-species rarely interbreed, because of behavioural differences or geographical isolation, so there is great genetic variation between groups. This is not true of humans. Extensive migration has resulted in greater variation within population groups than between them – 86 per cent of all variation between people is found in every human population, though genes are present at different frequencies. Ten per cent of genetic variation is specific to different continents, leaving only four per cent of variation unique to distinct populations.

Individuals better suited to their environment

GENETIC VARIATION IN HUMAN POPULATIONS



AT A GLANCE

Linking race to medicine is bound to be controversial. The main problem is that our definitions of racial categories do not generally tell us very much about our genetic differences on an individual level.

are more likely to survive and reproduce, passing down their genetic advantage to subsequent generations. But these evolutionary heirlooms come with a cost. There is a price to pay for immunity. Changes that provide resistance to one disease can leave us at risk of another. An example is sickle cell disease, which is a by-product of a very valuable adaptation to reduce the risk of malaria amongst people in Africa.

Environmental pressures faced by our ancestors do play a role in our health, but the difficulty is determining which population group an individual is descended from. Our genomes are a mishmash of information from our distant relatives. The intricate structures of population groups are bulldozed by generic terms such as 'White', 'Black' or 'Asian', and any relevance they may have is lost. Things as simple as the colour of our skin or the curliness of our hair are not enough to provide major insights.

In addition to the difficulties of accurately describing population groups, there is the risk of drawing false conclusions. Medical differences between ethnic groups are also related to socio-economic differences. Perhaps more effort should be made to resolve the environmental inequalities faced by minority groups that result in poor health instead of focusing on 'racial' medicine.

The adoption of race-based medicine could have far-reaching effects. Patient pressure groups can already make deciding which drugs to provide on the NHS a political minefield. Because most variation between humans is between individuals rather than groups, personalised rather than race-based medicine may be the way forward. Pharmacogenomics researchers are investigating individual differences in our DNA that affect our susceptibility to disease. Prescriptions would be determined by our individual genetic profile rather than our membership of some vague racial group. ■

Lara Crossland, ESRC Genomics Policy and Research Forum
www.genomicsnetwork.ac.uk/genomicsforum



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MUMMY LION AND DADDY LION: THE HUMAN ZOO

Where the wild things aren't

THE TREND MAY be for zoos to show animals in a 'natural' setting, but their audience actually prefers to relate to animals as if they were more like humans. Research shows that many zoo visitors seek closer, more anthropomorphic encounters with the animals, despite stating that they rather would see displays that 'look natural'.

Since 2002, UK zoos have been required to encourage public education and awareness about the natural environment and issues such as biodiversity. Dr Nils Lindahl-Elliot at the University of the West of England examined how the Bristol Zoo Gardens and the Paignton Zoo Environmental Park have chosen to display wild animals. The displays tended to fall into one of four types: a mainly visual simulation of the animal's original environment; displays using explanatory signs to show how the animal represents its species; an interactive display inviting the audience to engage in action-reaction animal encounters, or using the sense of touch, smell or sound; or a display encouraging people to identify with the animals – humanising the animals or 'animalising' the humans.

The study as part of the Science in Society Programme, involving 35 family groups, showed that all the visitors expressed preference for the first, naturalistic type of display, saying it was important



Young children are often disappointed to discover that many animals lead rather sedentary lives.

to have 'big enclosures' that 'resemble natural habitats'. Similarly, they dismissed displays of the fourth type as 'animal shows' and 'funfair rides' which were 'coaching animals to perform tricks'.

But when they actually visit the zoos, the participants engaged in all of the different types of display – and particularly the third and fourth (interactive and anthropomorphic) types. At both zoos visitors tended to compare animals with humans or with animals familiar from home, for instance by identifying the 'mummy lion' and 'daddy lion', or comparing sleeping lions with their pet cat.

Films like *Harry Potter* and *Finding Nemo* made young children engage more strongly with some displays, for instance, closely studying clownfish or plumed basilisks – and being surprised to learn that the latter were not snakes. Action-filled television documentaries made children disappointed when the animals did not move. Children asked repeatedly whether they were 'pretend animals'.

The findings show that the requirement for environmental education is challenging. Visitors expect zoo displays to look like 'nature' as seen on television. At the same time they contradict this preference by seeking closer, human-like engagement with the animals on display. ■

<http://www.sci-soc.net/SciSoc>

AT A GLANCE

There is a dichotomy between what people say they want to see in zoos and what they actually engage with on zoo visits. They say they want to see animals in a 'natural' setting but actually tend to anthropomorphise.



Illustration Simon Pemberton

Sperm donors – the right to know

SHOULD CHILDREN of sperm donors have the right to know who their father is? The Government has yet to decide. But a study by Jennifer Speirs at the Centre for Social and Economic Research on Innovation in Genomics suggests that sperm donors could agree. A study of donors between the 1960s and early 1980s shows that many would donate today even if they were identifiable. The donors supported the principle of a contact register like UK Donorlink, where offspring can find donor information if the donor has registered. The number of personal sperm donors known to

recipients could also be increased if there were more clinic facilities and better accessibility.

The survey showed that some donors would welcome contact from their donor offspring, but there was uncertainty about how it would be managed. Some donors were concerned that pre-1990s donors are liable to financial support claims from donor offspring until they are 25 years old, or to a claim on the donor's estate if he dies. This legal liability has prevented some donors from registering on UK Donorlink. ■

<http://www.innogen.ac.uk>

Why social science?

RESEARCH IS ESSENTIAL FOR WELL-DESIGNED POLICY

LORD TURNER
Chair, Economic
and Social
Research Council



ONE OF THE striking features of modern politics is the comparative absence of ideology. When I was an undergraduate, there were fundamental disagreements about the appropriate organisation of society, a great debate between capitalism and socialism.

Today, those debates have largely disappeared. Public policy arguments now focus on the detailed management of specific problems against a shared assumption that market economies are more efficient than planned economies but that significant government intervention is needed to ensure that economic dynamism is compatible with a good society.

But that does not mean the challenges of government have diminished. There remain complex problems that require well-designed solutions and where excellent research is essential. Good social science is crucially important.

At the Pensions Commission, which I chaired from 2003 to 2006, we were very aware that to design good pension policy, you have to place technical pension system issues within a wider understanding of the consequences and challenges of an ageing society. With people living longer, are they going to face a healthy ageing process, with later retirement and more active enjoyment of retirement, or an unhealthy one of growing frailty and

Economic and social research benefits society through its immediate relevance to policy and practice and via the slow percolation of ideas for understanding the challenges we face

dependence on others? What kinds of jobs will people be able to do if they spend longer in the labour force? And what are likely to be their attitudes towards saving?

To address these questions, we needed to access top quality data – from such resources as the census, the birth cohort and age group studies and the household panel surveys. And we needed to draw on analytical methods that cross disciplines – from financial analysis of rates of return to understanding behavioural responses to choice and uncertainty. We needed rigorous analysis conducted by researchers from a variety of different disciplinary backgrounds.

Ageing is something that many developed countries are experiencing. And there are many other issues that need to be analysed with a global perspective. Globalisation is something of a cliché, but it is a real phenomenon, and one we need to understand, neither exaggerating nor underplaying its significance.

One important set of issues relates to the ability of companies to compete successfully in a global economy, an area of focus for many academics in economics and management studies. But there are also questions about

whether globalisation increases inequality by changing demand for different skills, a debate that has implications for the analysis and evaluation of a range of policies, including income support, the minimum wage, and education and skills.

And after Sir Nicholas Stern's great report on the economic consequences of climate change and the challenge of achieving co-ordinated global action, much further work is essential to define specific policy responses at both national and global level. This work often crosses the boundaries between physical and social sciences.

The global character of economic and environmental challenges is matched by the increasingly global nature of terrorism and security concerns. Social instability and radicalisation in foreign countries can have consequences within our borders: but developments within our own society can also sow the seeds of terrorism.

Debates about immigration, multiculturalism and integration need to be based on an understanding of what we mean by identity and values, to what extent strong religious beliefs may be rooted in sociological and economic factors, and how radicalisation can lead religion to justify violence. These are fundamental questions that need input from a variety of disciplines – from economics to history, psychology to social anthropology.

Across all these issues and many more there is a need for high-quality research. The ESRC funds such research on a wide range of topics, including globalisation, climate change, demographic change, religion and identity, and the determinants (economic, social or cultural) of human wellbeing.

Much of that research helps answer questions relevant to short and medium-term public policy or private business practice. But we also fund more speculative developments in theory and methods to support the development of academic disciplines of the highest international quality. And through ESRC studentships we fund the training and development of the next generation of academics, without whom we will lack the ability to answer future as yet unanticipated questions.

It is vital indeed that there continues to be funding for high-quality research that does not fit in with pre-set agendas. We should not be solely utilitarian in relation to academic research: knowledge is of value for its own sake as well. When we see ideas for research which are innovative and excellent, we seek to fund them.

Economic and social research benefits society through its immediate relevance to the design and evaluation of new policies and practices in both the public and private sectors; but also through the slow percolation of new ideas into our understanding of the challenges society faces, and through the development of new analytical techniques. The ESRC's role is to foster the health of our social science research base, for both short and long-term benefit. ■

<http://www.esrcsocietytoday.ac.uk>

THE LOWDOWN



Astronomy

We have always gazed at the stars – but how much do we spend doing so and what do we learn?

PROFESSOR IAN ROBSON talks to Ginny Russell and considers our fascination with the stars

You are a great supporter of children’s astronomy. Why is it important that young people look at the night sky?

For me it all comes down to understanding and appreciating our place in the cosmos. We are just one solar system in our galaxy of over a million million suns, our galaxy is one of billions and billions in the Universe, yet we exist and can appreciate all this. It allows you to ask such fundamental questions as ‘How did it all begin?’, ‘What will happen to the Universe in the future?’, ‘Is there other life out there?’.

In the past, did people look at the stars much more than we do today?

There was hardly any light pollution and not much alternative entertainment in the evenings. Just looking at the stars reminds you that it is something humankind has done since the beginning. In the past the black rural skies were spectacular for everyone. All civilizations used the stars as a calendar for crop planting and many transposed their gods and myths into the star patterns.

And astronomy shows us where we’re placed?

We have learned about the solar system by observation. The planets move against the background of stars. The most obvious ones to see are Venus (never far from the Sun), Mars (glowing red), Jupiter and Saturn. The Moon shows phases as it crosses the sky and takes 28 days to repeat the pattern. That’s because we only see reflected sunlight when we look at the Moon and its orbit around the Earth takes 28 days. The patterns of the stars we see also change over the course of a year. This observation told us that the Earth moves around the Sun and that it takes a year for us to return to our starting position.

PROFESSOR IAN ROBSON, Director, UK Astronomy Technology Centre, Royal Observatory, Edinburgh



How much does the UK invest in astronomy?

About £160 million a year. A significant amount of this goes into supporting the people who do the research, providing new instrumentation to make existing telescopes more powerful and building experiments that can be flown in space or travel to other planets in our solar system.

Why should we invest in astronomy?

To answer the really big questions, like how stars form and die, what will happen to the Sun, how planets form, how life forms – and every other question in between!

What are the most exciting projects that we are currently involved in?

The ALMA (Atacama Large Millimetre Array) project is constructing up to 50 large radio telescopes in the Chilean desert, 5,000 metres above sea level. This international project will cost a billion dollars and will take 15 years. We are also involved in designing and constructing the next ground-based optical-infrared telescope, called the ELT (Extremely Large Telescope). This is in the early design stage but will have a main mirror over 40 metres in diameter. We are also helping to make one of the instruments in the space telescope that will replace Hubble in 2013.

What can a lay observer look forward to seeing in the night sky in 2008?

Every year there are meteor showers: bright streaks flashing across the sky caused by bits of rock burning up in our atmosphere. The rock is debris from the tail of a comet as the Earth’s orbit intersects the comet’s orbital trail. The best time to see a meteor shower is around August 12. ■

<http://www.roe.ac.uk/ukatc>