3 June 2008

Preface and report:

'Public attitudes to biobanks and related ethics and governance issues'

Part 1. Background information on the commissioned report

Introduction

The purpose of the UK Biobank project is to provide a resource for research with the aim of improving the prevention, diagnosis and treatment of illness and promoting health throughout society. The resource is expected to contain health and lifestyle data and biological samples from 500,000 individuals aged 40-69 at time of enrolment.

Participants will grant access to their health records, provide some biological samples (e.g. blood and urine), have various measurements and answer questions about their lifestyle. The cohort will be followed up for decades, capturing all major health episodes and eventual death. The consent obtained at enrolment will allow the resource (data and samples) to be accessed and used for research projects in the future that fall within the purpose of the project.

The UK Biobank Ethics and Governance Council (EGC) is an independent monitoring body that advises on the ethical framework under which UK Biobank operates.

In 2006, the EGC commissioned a report which aimed to provide an overview of the current literature regarding the public's attitude to UK Biobank related issues. The final commissioned report is attached below.

Why we commissioned this research

A key function of the EGC is to advise UK Biobank on the interests of research participants and the general public in relation to the project. Given this role, the Council considered it appropriate to apprise itself of the current literature which reports on public attitudes to UK Biobank related issues before considering whether or not to commission its own public attitude surveys. In this way the Council aimed to establish a firm, broad foundation for this aspect of its advisory role by drawing on the already extensive literature in this area and to be sure that any commissioned report would add value to that literature.

Research aims

The research was commissioned with the following aims, to provide:

- a summary of trends, gaps and conflicting findings regarding public attitudes to biobanking
- a full reference list
- a list of groups working in this area
- recommendations for future work on public attitudes in this area.

Research outcomes

The report is attached at Part 3 of this paper. It should be noted that the conclusions are those of the authors and not necessarily those of the EGC. The report is a snap-shot in time, produced as it was in 2006. The EGC has chosen to publish the report in the interests of transparency.

The scoping study provided valuable information to the EGC concerning studies which have already been conducted on the public's attitudes/opinions/expectations to biobanking-related

issues. In light of the report, the Council went on to commission a public attitude survey to ascertain opinions regarding access to the UK Biobank resource (including intellectual property, commercialisation of research findings and models of benefit-sharing). This latter report should be finalised in 2008 and will appear on the EGC website in due course.

Part 2. UK Biobank integrated pilot: Public opinions and understandings

An integrated pilot of UK Biobank was conducted between February and June 2006 during which 60,000 people were invited to participate in the project. During the pilot, the opinions and understandings of the potential participants were ascertained (for example through telephone responses to the invite and through a post assessment centre visit survey). A brief summary of these findings follows,[1] along with a description of how the recruitment process has been revised in light of these findings. The Council considered that these findings might usefully be read in conjunction with, and as a supplement to, the commissioned report.

Acceptability of the method of invitation

One of the main objectives of the integrated pilot was to see whether the centralised approach used to invite participation caused any serious concerns in the general population. Potential participant are identified from National Health Service records. For this purpose only the potential participant's name, address, date of birth, NHS/CHI number and general practice is used. These details are processed centrally on behalf of the NHS in accordance with the Data Protection Act. Potential participant are sent a provisional assessment visit time which they are able to confirm, change or cancel by phone to UK Biobank's dedicated Participant Resource Centre, by returning the reply form or through the project's website.

Nearly 600 questions were recorded by UK Biobank during more than 8,500 calls made to the Participant Resource Centre during the integrated pilot (excluding questions relating to confirming or changing appointments). The integrated pilot report states that the majority of these questions related to practical issues about the assessment visit (e.g. how to get to it and what would happen during it), which it being addressed in the main phase of recruitment through appropriate modification of the invitation material. Fewer than 50 of the recorded questions related to how a person's contact details had been obtained or a person had been selected for invitation. An analysis of such enquiries indicates that the majority of those callers confirmed their assessment centre appointment and joined UK Biobank [30/48; 63%] (see section 2.4.4 of the Integrated Pilot Report).

10,000 people responded to the invitation letter by declining to participate. Of these, 7,052 people were willing to provide their reasons. Only 57 of those who provided their reasons indicated that they did not want to take part because of concerns about the way in which they had been invited to participate (i.e. about 1 in every 1000 invitees). Only 10 people who did not take part raised concerns over being sent a provisional appointment.

Reasons for not participating

Of the 7,052 responses which indicated the reasons for non-participation UK Biobank identified about 7,000 classifiable reasons for not participating, with a few respondents providing multiple reasons and some providing responses that were too

[1] The majority of this text is extracted from the Integrated Pilot Report 14 November 2007 available at: http://www.ukbiobank.ac.uk/about/what.php

general/vague to classify. The most frequent reasons cited were: too busy, too unwell and too far to travel.

Post-visit survey: participants' opinions on the recruitment process and understanding of consent

A 10% random sample of people who attended an assessment centre appointment during the pilot were asked to complete an anonymous postal survey about (among other things) the quality of the invitation materials, the service provided by the Participant Resource Centre and their understanding of the consent given. A 65% response to this survey was achieved. The integrated pilot report states that participants were very positive about the length and content of the invitation materials, that their concerns and questions were addressed satisfactorily, and that there was good understanding of the measurements and samples to be collected. For the small proportion with questions not addressed beforehand by the invitation materials or Participant Resource Centre, these participants indicated that their questions were subsequently addressed by staff at the start of the assessment visit (see section 2.4.5 of the Integrated Pilot Report).

At the start of the assessment process, participants are asked to provide written consent using a touch-screen system with an electronic signature pad. A summary of the main points relating to participation are displayed on the computer screens immediately prior to consent being sought. A member of staff is on hand to guide participants through the consent process, and is available at all other times.

The post-visit questionnaire tested participants' understanding of the consent they had given. UK Biobank found that "almost all respondents correctly recollected that the consent process indicates that participation involves providing blood and urine samples. Three quarters recalled that they were allowed to skip some questions if they wished, but fewer than half recalled that they did not need to undergo all of the physical measurements" (see section 4.3.3 of the Integrated Pilot Report). This is being addressed in the main phase of recruitment through appropriate modification of the information material.

The questionnaire also tested participants' understanding of the long-term implications of taking part and found that almost all participants were well informed. The integrated pilot report states that "Most participants recognised that they could withdraw at any time and for whatever reason…. Moreover, they were able to distinguish subtle, but important, differences: for example, participation involves allowing access to their own medical records, but not those of family members. Participants' understanding of the purposes of the project is further highlighted by analysis of their stated reasons for participation, with almost all indicating that they did so *"to help improve the health of future generations"* (see section 4.3.4 of the Integrated Pilot Report).

At the end of the post-visit survey, participants were asked how they would respond if a close friend or family member asked them about taking part in UK Biobank. The integrated pilot report states "The vast majority were very willing to recommend participating and only a very small minority (2%) expressed any concerns. Analysis of additional comments provided by this latter group of respondents indicated that these concerns mainly related to practical issues (such as the visit duration and waiting times), which are being addressed ahead of the main phase based on experience during the pilot" (see section 4.3.5 of the Integrated Pilot Report).

Revision of the recruitment process and materials in light of the expressed opinions

UK Biobank has responded to the feedback contained in the telephone calls, the participant reply forms and the systematic post-visit survey as follows:

The invitation and information materials have been revised for the main phase of recruitment to make it clearer that: UK Biobank only has access to contact details (and not to medical information); the appointment is only provisional, and can be changed/cancelled (or ignored); there are weekend and evening appointments to make it easier for working people; people with medical conditions and disabilities are eligible; participation only requires a single assessment visit (and does not involve any treatment intervention); travel expenses are available; participants do not need to undergo all of the physical measurements (including adding messages to this effect at the beginning and end of the touch-screen phases of the visit). A sentence has also been added to the invitation letter to apologise in advance in case an invitation arrived at a difficult time (e.g. ill health).

The amount of information in the primary invitation letter has also been reduced, with supplementary information about the visit now sent out in a second confirmation letter for those who indicate that they will attend the assessment centre. UK Biobank hopes that this debulking of the initial invitation letter should help to ensure that key information is more obvious to invitees (for example, how the person was identified and selected, and the compliance of the invitation method with the Data Protection Act).

Beyond the pilot phase

UK Biobank intends to continue the post-visit survey during the main phase of recruitment (albeit in a smaller random sample) as part of the central procedures for monitoring the assessment centre operations and learning from participant's experiences on an ongoing basis. The Council endorses this monitoring approach and will review UK Biobank's findings during the main recruitment phase.

Part 3. The commissioned report

Public Attitudes to Biobanks and Related Ethics and Governance Issues

Final version: 2 January 2007

Joanne Sumner

Introduction

This report was commissioned to provide the Ethics and Governance Council (the Council) with a summary of the trends, discrepancies and gaps in the current literature on biobanks, with a view to issues affecting the UK Biobank Ethics and Governance Framework (the Framework) and the start of recruitment in early 2007. The report concludes with recommendations on future areas for public attitudes research.

An extensive search of the academic and policy literature was conducted using all the databases, journal and internet searches available to the author (including SCOPUS, Web of

Science, PubMed Central, Psi-Com, Web of Knowledge, Science Direct, Ingenta Connect, Springerlink etc., as well as the catalogue of the Wellcome Trust Library). This prioritised research published since 2000. Acknowledgment and thanks are due to Maria Juliana Moraes de Araujo for her help with the searches.

The resulting bibliography is attached to this report and includes details of author institution, country, and hyperlink to the reference where available.

Notes on interpretation and other limitations

The types of source material vary widely, including qualitative interview research, focus groups, quantitative interview, telephone and postal surveys, workshops, consultative panels and literature reviews. This makes strict comparisons difficult to achieve, so a thematic and inevitably somewhat subjective approach has been taken to reporting in order to give the Council an overview of public attitudes, perceptions and expectations.

The report focuses on findings from the UK, with reference to international findings when these shed light on interpretation in some way. The picture of attitudes in other countries is therefore limited, though some useful reviews can be found in the bibliography (for example by E Einsiedel for the Canadian Biotechnology Advisory Committee).

Research on attitudes of and to children as research subjects have generally been excluded, as has work on embryos, stem cells, cloning, etc.

Science, medicine and medical research in general

A joint Office of Science and Technology (OST) and Wellcome Trust (WT) survey in 2000 found that two-thirds of those surveyed felt that science and technology was making our lives healthier, easier and more comfortable (1). Similar general appreciation of the benefits to society was found in research by Cragg Ross Dawson (CRD) on the proposed biological sample collection that became UK Biobank and in research by Opinion Leader Research on issues relating to the Human Tissue Bill (2, 3). However, in all three members of the public also expressed a tension between these perceived benefits and a sense of society not being fully in control of the speed or direction of development, and of a general lack of openness and accountability.

Thus, more than two-thirds of respondents in the OST/WT survey commented on the ineffectiveness of rules to stop scientists “doing what they want behind closed doors” and over half thought that scientists tried new things without thinking about the risks of their research. In the CRD groups the good will towards well-intentioned medical researchers was qualified by a feeling that they might have too narrow a focus on their work, and therefore fail to take into account the wider ethical and moral guidelines governing society.

Partly this undercurrent of concern seemed to relate to a lack of knowledge of how science and medical research operates (3), and wanting to be more involved but not being able to see how to achieve that – indeed, of being expected to take things on trust to some extent and not being clear which body or organisation could be identified as representing the ordinary person’s view (1).

Genetics and genetic research

Views on genetics and genetic research were mixed. There was a tremendous sense of the potential of genetics to provide better cures and medicines, e.g. 9 in 10 of the People’s Panel consulted on behalf of the Human Genetics Commission (HGC) (4); 70% of the Irish public consulted by the Royal College of Surgeons in 2005 (5). However, there were also

significant concerns about “tampering with nature” among the same groups and the feeling that some genetic research was not ethical (e.g. a running theme in the UK literature was the negative association of genetics with human reproductive cloning, such as in the national postal survey by Calnan and colleagues (6)). There was also agreement by some that genetic information required particular protection, e.g. 49% of respondents to the HGC’s *Whose hands on your genes?* consultation (7).

These concerns are not universal – as might be expected, Cragg Ross Dawson (amongst others)found that those with more familiarity with genetics and genetic research were also more accepting, not feeling it was as mysterious or sinister as some of their fellow respondents (2), and Helen Busby found that many of the genetic research participants she interviewed “felt that genetic research was now very much on the agenda and could be seen as an indicator of good modern science, and so in a sense not particularly novel, troubling or noteworthy.”(8)

The personal and familial implications of genetic research were raised at several points – see the discussion of provision of individual health feedback, summarised below. In particular, work by Hjörleifsson *et al* with participants and scientists involved in the Icelandic Health Sector Database has highlighted that even those who feel positively about the potential benefits of genetic technologies have concerns that extensive predictive genetic testing leading to preventive treatment and tailoring of lifestyle to avoid disease onset may be experienced as a loss of freedom, and that human subjectivity and health need to be considered “in their full range” when thinking about the implications of genetic knowledge (9).

UK Biobank – an initial view

The main UK Biobank funders (the Department of Health, Medical Research Council and Wellcome Trust) have commissioned a number of consultations with members of the public and other stakeholder groups from when the project was first proposed through to the publication of the Framework. Throughout these consultations there has been a generally positive initial response to the idea of setting up this major resource for research (2, 10, 11, 12, 13, 20). A common theme is that the concept needs detailed explanation, with a clear outline of the potential benefits and harms e.g. see *A question of trust* by People Science & Policy Ltd (PSP) (10).

The first consultation, undertaken when biobanks were still relatively unknown, found that participants’ initial positivity was shaken when facilitators prompted consideration of potential concern, though their first positive response was normally restored after discussing further information about the proposed plans and safeguards. For example, participants found the term DNA had worrying connotations (i.e. of ‘big brother’), that the request for lifestyle information was puzzling and intrusive; and that medical records were seen as too personal to hand over to unknown researchers (2).

Another overall theme was a concern that the biobank be truly diverse, recruiting as representative a sample as possible and employing flexible recruiting methods in order to ensure that hard-to-reach groups are included (13). Similarly, research of relevance to all groups should be conducted, not just on “profitable diseases” or diseases of the majority:

> "There are all sorts of genetic diseases and certainly genetic conditions that are predominant in Caucasian societies that are better looked at, because of the funding that they will get, and the status and the publicity. As opposed to genetic conditions that are prevalent in non-whites. Those don't seem to be quite so high profile." Indian Hindu female (2).

Participation in research

Rates of participation / willingness to participate

A number of studies have looked at rates of participation or anticipated willingness to participate in biobank and other tissue research. These are difficult to compare because they relate to a variety of types of tissue, uses and safeguards. As an illustration, high rates of participation or willingness to participate have been found as follows:

- the North Cumbria Community Genetics Project (NCCGP) achieved a full participation rate of 60% (umbilical cord, blood from mother and mother's questionnaire) and a partial participation rate of 90% (cord and blood only) (14);
- a large majority of the 100 healthy volunteers surveyed at a dental practice in Newcastle said they would be willing to donate tissues for research, and 65% of those would be happy for tissue to be used in genetic research (15)
- 86% of the Irish public would donate 'surplus tissue' with 87% of those willing for it to be stored for research and 89% of those being willing for their sample to remain identifiable (5)
- a Swedish postal survey of people aged between 18-80 showed a clear majority would provide a sample for a biobank(16);
- 95% of African American and White American cancer patients would donate 'surplus' tissue, including for future research on other diseases with few wishing to impose controls on how it would be used (17); and
- the National Health and Nutrition Examination Survey (NHANES) found that 84% of their participants in 1999 and 85.3% in 2000 were willing to contribute a biological sample for largely unspecified genetic research (only 1% of participants chose to donate a sample for use only in non-genetic research) (18).

In relation to biobanks specifically, preliminary consultation regarding Generation Scotland received a positive response and willingness to participate (19), the great majority of participants in PSP's *A question of trust* groups were willing to participate (10), and research by Shickle *et al* using a variety of consultation methods found a range of responses, but particularly that those within the target age range were the most likely to be willing to participate (20), which was reflected in findings from a recent Swedish study (16).

Motivations

Motivation to participate or express willingness to participate is potentially more complex than it first appears. The majority of respondents across many studies that have looked at this refer in some way to altruistic motivations, conceived in many ways: taking part in medical advance, helping future generations, helping the particular country or community from which they come, helping their children or extended family, and so on (2, 5, 10, 14, 16, 19, 21, 23). In some cases, there is also a clear expectation of some personal or familial benefit, irrespective of whether this has been promised (19, 25); for example, in the initial Generation Scotland consultation, concern was expressed that the project should not be oversold to members of 'vulnerable' patient groups, because they might have the highest expectations of personal benefit in the near future (19).

This has led some researchers to question the notion of 'pure' altruism where no return of any sort is expected by the donor, seeing the act of donation instead as reflecting the existence of 'exchange relationships' that form the social basis of a society and where some form of reciprocal benefit is expected, however apparently removed from the donor (e.g. this will cost me nothing or little, but has the potential to benefit others a great deal (21)). It also suggests the need to consider the forms of benefit however small or intangible that could be

offered, and explicitly named – to individuals, groups and wider communities – rather than focusing on 'educating' participants that they should not expect benefit (8). Indeed, this echoes comments made in both early and later consultations on UK Biobank and its Ethics and Governance Framework that the benefits of the biobank need to be more clearly spelled out, both those that will and will not be offered, and that tangible benefits such as provision of some health information be reconsidered, e.g. from the enrolment session or if clinically significant findings result from later research (10,12).

Other factors that positively influence willingness to participate include: previous experience of or benefit from medical research (whether as a participant, a patient or a relative) and a perception of low risks and requirement of little active participation (14, 24). Participants may also feel a cultural pressure to participate and this may relate to the sense of donation being part of an unspoken or spoken exchange. For example, participant mothers found it difficult to explain why non-participant mothers had refused to donate: "Thus helping is not just a worthwhile activity in its own right; the language of helping is also a way of establishing the sort of person that one is and of distancing oneself from the puzzling sort of person who does not want to help" (21). Indeed, non-donors expressed the desire to help as strongly as donors, but in the circumstances other factors weighed more heavily with them (e.g. lack of control over what would happen to the sample).

Haimes and Whong-Barr have outlined four styles of participation from the work with the NCCGP, which may help give some shape to these various motivations – those who are active/keen to donate; those who analyse the costs and benefits to themselves and others; those who are passive or see no reason not to donate; and those who are reluctant, or feel a sense of guilt if they do not donate (21).

Barriers or enablers

Local social context needs to be taken into account in planning recruitment; for example, reasons for non-participation in the NCCGP included early funding for the project by British Nuclear Fuels (22). It is also critical in planning supportive and enabling processes for recruitment and consent. So while building research recruitment into a clinical consultation might be convenient and lead to high participation rates, it can also create confusion as to exactly what has been donated and for what purpose (26, 27). More worryingly for one NCCGP participant, it resulted in regret over the decision to donate:

> "It could be pressure from the midwife who may say something like, 'Oh, flaming donate! The placenta, it doesn't really matter, it just gets thrown in the bin anyway.' … *Making the issue seem very small and insignificant.* It would be the way it's actually put over when you have an antenatal visit or whatever... I really wished that I had more information and that I was better informed and I wish I wasn't put on the spot to make that decision because I don't think that I was in the right frame of mind to make the right decision." (14)

The role of the GP in recruitment was discussed in all consultations on UK Biobank. Generally, respondents were positive about the initial invitation coming from the GP, representing as it did either implied or explicit endorsement of the research (12, 13, 20). Some assumed that GPs would be more actively involved in identifying potential participants, following up findings than would actually be the case (13). This should be made clear in the consent materials and an approach directly from UK Biobank might be warranted. Others raised concerns about not wanting GP involvement to impact on healthcare delivery, while noting that a direct approach from a largely unknown organisation would feel like a breach of confidentiality (i.e. passing on names, addresses, and possibly some health related details without permission, e.g. Robling *et al* (28), public panel consultation on the Framework (12)).

For some minority ethnic groups - Africans and some Asian Muslims – there were also concerns about GPs having access to information about lifestyle, about their GP giving them all the relevant information, and about GPs pressurizing people whether intentionally or otherwise:

> "If you've got a strong enough personality, all right. But you get a lot of feeble people who look at the GP as someone up there, and if the GP says 'Will you do this?' they might consent to it on the spot where really if they're given a chance to go away and think about it they might not." (2)

Other factors that might be barriers to recruitment included:

- concern over who will have access and lack of control over what happens to samples – particularly access to commercial companies, insurance companies, employers and the police (29, 30). Clarifying which of these groups would be granted access, why and for what purpose, would reassure some potential participants. Questions of access and commercialisation are explored below.
- practicalities – making sure that the timing, location and content of the enrolment session is as convenient as possible, particularly for hard-to-reach groups, and ensuring that information has been given at appropriate times and in appropriate detail prior to seeking consent, so that the potential participant has as much information and choice as they wish and understands why they have been selected and why they are important to the research (10, 11, 13). Such an awareness raising campaign is credited with an 8% rise in willingness to donate over the course of one year in the NHANES project (18)).

Choice, trust and the role of informed consent processes – bridging comments

Before moving on to discuss informed consent findings in detail, it may be helpful to consider findings from Höeyer *et al* regarding the role of informed consent in deciding to participate in a Swedish biobank. Among their first 29 interviewees, only 8 claimed to have read the consent form, and only 2 could remember its main elements. Neither donors nor non-donors could remember any piece of information from the form that had influenced their choice. When asked why they donated, interviewees talked in general terms about benefits for society and a shared responsibility for medical advance. The researchers point out that this does not entail that donation was a mistake, rather that the preoccupying factors in deciding whether or not to donate are broader collective concerns – namely, equality of access to research results; balancing the influence of corporate interests; and, establishing “good institutional conditions for research” (26, 27).

Höeyer and Lynöe, supported by findings from the ELSAGEN project (30), suggest that as concerns such as these cannot be addressed at the individual level in informed consent processes participants are left with a more limited choice than may be intended: To take part knowing that fundamental reservations may not be addressed elsewhere in the system, or to not take part and also not fulfil a perceived duty as a citizen (26). Choosing to trust in the establishment in such circumstances may be a way of resolving ambiguity and uncertainty, and may explain why so few participants paid attention to the informed consent material (26). The choice may not be as stark as presented, i.e. participants may feel that the limitations of their knowledge mean that they choose to trust researchers and healthcare professionals regarding the detail and are content to participate on that basis (14; also see Busby (8), Skolbekken *et al* (23), Helgesson *et al*(31)). Indeed as Höeyer himself states in another paper: “in lived experience a nurse is a better (and more easily accessible) guarantee than an information leaflet” (27). However, it does raise the question of what regulatory practices could address the actual scientific and ethical concerns expressed by participants.

Consent: is the consensus that there is no consensus on the 'right' form of consent?

Styles of consent

As indicated above, several studies show a varying understanding of the research details and sometimes only a basic grasp of the purpose of research. While there is a strong presumption in favour of consent for collection, storage and use of data and samples in biobank research (3, 7, 19, 31, 33, 34), there is a lack of consensus overall regarding the type that is most appropriate: one-off general consent to participation including future as yet unknown uses; repeated consent for each use; or a combination, such as annual consent.

This resonates with Haimes and Whong-Barr's styles of participation; it also requires biobank managers to provide consent processes that balance the information and control requirements of the highly 'active' consenter with those of the happily 'passive' consenter. Further, as Helgesson *et al* note, it requires discriminating between ill-informed participants, where extra efforts are required by researchers to raise awareness and understanding, and respecting conscious choices to limit the information on which to make a decision (32).

David Wendler of the National Institutes of Health Department of Clinical Bioethics has undertaken a useful review of research on consent for research on human biological samples. This covers 30 international studies involving more than 33,000 individuals over a 10 year period (31). He concludes that a simple one time choice whether their samples are used for research, on the understanding that an ethics committee will decide the studies for which samples are used, will be acceptable to the majority of potential participants and proposes that this provides a 'reasonable person' standard for consent to this type of research.

However, a number of studies record significant numbers of respondents who would prefer to consent to each use:

- the People's Panel found 4 in 5 thought specific consent for research on stored samples was necessary in each case, though this was significantly less so amongst 35-54 year olds (4);
- *Whose hands on your genes?* respondents were divided: 39% in favour of specific consent, 32% in favour of general consent and 25% saying it was circumstance-dependent (7);
- the joint NHS Information Authority, Health Which? and Consumer Association study of sharing patient records (36) found similarly mixed views, but those in the focus groups, recognising the greater feasibility of general consent, responded by setting conditions which would make it acceptable, including anonymisation and rigorous security;
- in their recent survey the Royal College of Surgeons in Ireland found 44% of respondents favoured general consent, 36% favoured consent to each use, and 16% favoured being given a choice between the two styles at recruitment (5);
- in a similar vein, a recent Swedish survey (35) found that 48% of respondents thought they would feel involved and respected if consent was sought for each use, though 28.1% thought it would be wasted money, 21.3% were indifferent, 11.3% thought they would feel like they had received superfluous information and 9.2% would feel concerned about the implication of ill health.

Interestingly, these researchers also highlight that late respondents to their survey (i.e. those responding after second and third reminders) were more likely to say it was not important to air their views, potentially indicating that a considerable proportion of normal donors will be less inclined to read and respond to new consent sheets if these are distributed for each project, and thus leading to a higher drop out rate due to general lack of interest and

negative attitudes to research and healthcare, rather than the specifics of the research projects (35).

Factors influencing preferences on style of consent included whether or not samples and data could be traced back to donors; personal beliefs about individual rights to exercise control over what happens to their bodies and tissues; personal experiences with health care services making them more or less trusting; and tissue type, whether waste, replenishable (such as blood, urine), or integral (such as organs and tissue). Also people perceiving direct personal or familial benefit tended to set the consent bar lower (3).

Preferences of those consulted about UK Biobank specifically

Findings from UK Biobank specific consultations are consistent with these general messages. Seeking consent was considered crucial as a sign of respect for the individual (2). The potential benefits and harms should be explained (10), including regarding provision of individual health feedback; as far as possible, uses and users should be clear, including anticipated access by commercial companies (2, 20); and reassurance should be provided on measures for ensuring confidentiality and security of the sample collection and database. There was a similar divergence of views on whether general, specific or another form of consent should be offered, although discussion in focus groups conducted by Shickle *et al* found that general consent was acceptable. Participants in the PSP consultation on the Framework wanted to know how capacity to consent would be assessed, and some stakeholders believed that those with mental health problems may still be able to consent (12) and therefore be included in the research.

A Japanese study comparing consent and withdrawal rates in sub-cohorts of a major longitudinal research study found that providing more information regarding the genetic components of the research during the consent process reduced initial participation rates, but also reduced withdrawals within the first six months. For example, in one of the sub-cohorts, people had access to lectures at the town hall on clinical aspects of genes and lifestyle related diseases, as well as meetings explaining the research; the other sub-cohort had more standard notices, explanatory documents and explanation at consent. Less information at recruitment increased participation but also increased withdrawal; the extra time and information given by holding explanatory meetings meant the decision to participate was more 'firm' (38).

Recontact and use of data and samples after loss of capacity or death

Recontact was generally unproblematic (12,13); indeed, in some early consultations concern was expressed that data were updated more frequently to ensure information is accurate and up to date (10). Opinion Leader Research and People, Science and Policy both found that participants advocated asking volunteers to indicate whether they would want data and samples to be used after loss of capacity or death – this should then be respected by UK Biobank and by relatives. Some felt strongly that it would be inappropriate for UK Biobank to contact relatives of the deceased, either intentionally or inadvertently (11,12,13). As frequent recontact could lead to attrition, it would be important to indicate what sort of frequency participants might expect and what the reasons for recontact might be (12,13). Finally, it would be necessary to handle recontact carefully in order to avoid causing anxiety about possible ill health (12) and should relatives of those who have lost capacity feel they are too unwell to be contacted, this should be accommodated (12).

As a comparison, 55% of Irish respondents were content for data and samples to continue to be used if participants died, moved without forwarding contact details, or otherwise became uncontactable, but 31% felt this was unacceptable; and, as the researchers note, these figures are similar to recent Swedish findings (5, 35, 37).

Withdrawal of consent

Generally, the right to withdraw was seen as important and reassuring (2, 3, 11, 19). It was a way for UK Biobank to show good faith, and would enable participants to respond to a change in personal circumstances, or to register disapproval of uses or operation of the resource (12). Many felt that withdrawal should be easy and that UK Biobank should guarantee that samples and data will be destroyed if participants request this. However some respondents felt that it was reasonable to expect people to make a decision for the long-term (12), that withdrawal went against the nature of donation (19), and that the potential reduction in value of the resource from withdrawals meant that it should not be offered, or at least not made too easy. Members of the public panel consulted on the draft Framework also proposed a 'cooling off' period after consent, so that later withdrawals could be minimised (12).

There were mixed views on what withdrawal should mean in terms of cessation of contact, data collection, and use of existing data and samples (20); offering a number of options would mean that participants' wishes could better be respected (12).

Privacy, confidentiality and limits on access

Concerns about privacy and confidentiality of medical data are widespread, set against a context of low public awareness of routine information sharing practices between public services and within the NHS. A MORI survey for the Department of Constitutional Affairs (39) found that 60% of the public were very or fairly concerned about public services sharing their information, and only 12% were not at all concerned. The main drivers for these concerns are lack of control (25%), thinking permission should be sought (16%), and, lack of knowledge of who has access (20%), what is held (18%) and how it is used (18%). The same concerns run through the biobank-related literature (e.g. Robling *et al*, 28; or Höeyer *et al* who found that access to records was of more concern for the majority of their respondents than donating a biological sample for genetic research (35)).

Generally speaking there is some trust that the health service will handle confidential medical information responsibly (39) and there is support for the increased use of computing to improve communication and effective healthcare delivery (40). The desire to control information sharing increases as access moves further from the immediate care team, and while many members of the public are willing for their records to be used in research, there is a strong presumption that data should be anonymised unless consent to use identifiable information is given, and that identifiable information is only used when necessary (36, 43). This is confounded by a widespread lack of confidence in the security of computerised medical records and databases (2, 28, 40), suggesting that providing information on the stringent anonymisation and security procedures that will be in place in UK Biobank could reassure potential participants considerably (2).

The question of who will have access to their records seems to be more worrying than the way in which information will be used, so long as it is in the public interest. For example, see research on public attitudes to protection and use of health information by the School of Health and Related Research at Sheffield (ScHARR) (43). Respondents are often content for university and hospital based researchers to have access, but four groups are consistently singled out as problematic: commercial or pharmaceutical companies, insurance companies, employers, and the police (2, 7, 19, 28, 30, 41, 42, 43, 44). Thus, Levitt and Weldon raise the uncomfortable dissonance between donors potentially giving access freely and willingly and recipients taking the information for what might be termed 'bad faith' uses or misuses, e.g. to discriminate against individuals or groups in setting insurance premiums (30). This is seen as presenting a significant challenge to trust, which biobanks will need to address.

Access by commercial / pharmaceutical companies is dealt with in more detail below under commercialisation and benefit-sharing; however, there are mixed views on the remaining non-research users. For example, 59% of respondents to *Whose hands on your genes?* (7) felt that insurance companies should not be able to ask for test results in order to assess their premiums, and 37% said this was acceptable if there were controls on how the information was used. There was a clear majority view that employers should not be able to see genetic test results to determine if individuals are likely to be prone to an inherited disease or disability (84%), but views were more divided if tests were used to determine if an individual could be a risk to colleagues or others they meet into the context of their work, or to test sensitivity to substances they may encounter in the workplace. Respondents, here and in the People's Panel (4), were in favour of samples being taken by the police for serious crimes, though a small majority of respondents were not in favour of police access to medical research databases (62%) (7).

As well as seeking control over who may access the record, some respondents report that parts of the medical record are more sensitive than others, in particular regarding mental health (28), sexual abuse and violence (44). For example, the Improving Mental Health Information Project found that some users feel that knowing their health information may be shared may make them less likely to trust and speak openly with the health professionals they are dealing with (40). Or, in the case of the Icelandic Health Sector Database, HilaryRose found that those women with experience of being categorised as suffering from mental disease, sexual abuse or domestic violence "passionately wanted to keep themselves and their children out of the database. They wanted as few people as possible to know their painful secrets: confidentiality was immensely precious to them." (44)

Concern with privacy, confidentiality and security is not universal, however – some respondents reporting that 'they have nothing to hide', that they assumed information sharing would or should take place, or simply that it would be impossible to guarantee anonymity anyway (2). Also, patient groups are reported as strongly supporting research using personal medical data, resonating with a common and perhaps expected finding in much of the literature – that those most in need and/or most familiar with medical research are more willing to prioritise group and societal benefits over individual rights (42). Finally, ScHARR found that men, older people and higher social groups are more likely to be willing to share their personal health information (43), though this is not necessarily supported by research undertaken by Health Which? and the NHS National Programme for International Technology, which found that older respondents were more likely to want to control information flowing outside the 'caring loop' (45).

<u>Access to UK Biobank</u>

In most of the consultations on UK Biobank respondents were concerned to protect their personal information, but understood the need for a link to be maintained so that information could be updated (10, 12). Various suggestions were made regarding who could hold the key to reidentify data and samples – the chairs of the Oversight Body, Science Committee, NHS Research Ethics Committee, and the Chief Executive – and an audit of reasons for reidentification was suggested to ensure that anonymity was broken for the right reasons, as well as by the right people (12). Participants were content for access to be provided to NHS and university researchers (12, 20) for medical research, which was described as including "identification of the causes of illness and cures as well as investigating what is detrimental to health" (12).

Respondents expressed the same concerns regarding non-research users as described above, specifying that employers and insurance companies should be denied access to individual data, though accepting that there would be no way to prevent possible discrimination arising from access to published results (a number of respondents referred to

insurance misfortunes in the past, so the fear of potential unacceptable use of information was acutely felt in some groups) (10, 20). Access by commercial companies sparked much debate across the groups, though on the whole they were considered to be a 'necessary evil' to ensure development of new medicines (20). It was stressed that companies should focus on major healthcare issues and not just focus on profitable diseases (10). There was some ambivalence about police access (20), though it was more acceptable if a court order was granted (10), and access by the food, alcohol and tobacco industries was discussed and would possibly be acceptable in some circumstances (12).

Overall, those consulted felt that the possibilities and limits on access should be made clear and the safeguards explained in some operational detail during the consent process in order to build trust and confidence in UK Biobank (10, 13).

Lifestyle and environmental information

Some donors in the Medical Biobank at Umëa University reported feeling a "more proprietary relationship to questionnaire-data" than to blood samples (26). Similarly, interviews with donors to a study of possible genetic factors in psoriatic arthritis revealed that for many the photographs taken of their skin were considerably more worrying and invasive than providing a sample of DNA (8). One interviewee explained her attitude towards giving a blood sample:

> "… privacy is the way you run your life, not the way your life is, what you're made of is it really? You can't change the way you are made. You can change the way you run your life, you can change the way you are as a person, but you can't change the bits inside no matter how, I mean if it's inside me it's still me."

That is, while DNA is special in the sense of being an intrinsic part of oneself, it was not considered particularly vulnerable or sacred. On the other hand, a participant in the ELSAGEN focus groups described the opposite feeling "I would be extremely concerned if anybody were to break into my medical records or look at my DNA… I consider that absolutely sacrosanct, that's *ME*, really the inner me they're looking at." (30)

Cragg Ross Dawson found that while few people had reservations about providing information about their home and local environment, lifestyle was more problematic for younger participants and for some minority ethnic groups - if, as was assumed, it included sexual activity, drinking, smoking, illicit drugs, and particularly if the data would be available to their GP (2, also 10). Some religious and community leaders were concerned about ethnically based discrimination based as a result of providing lifestyle and medical histories (2). Participants consulted in both rounds of PSP consultations did not raise strong views about provision of lifestyle information, seeming generally accepting, and it was not raised as a concern in the Opinion Leader Research workshops on the draft Framework.

Provision of individual health feedback

Many studies report that respondents would like to receive personal health information from their participation in biobank research (3, 5, 31, 41, 46); for some, this included when the results were not clear, or if the condition was not treatable or preventable (5, 35). In some studies with a no-feedback policy some participants still expected it (8) or were confused as to whether it would be offered (25). It was also common for there to be a misconception regarding the relevance of the research to the health of participants or their immediate family (e.g.14).

88.8% of the 504 people contacted in a US telephone survey said they would want to receive results of uncertain clinical significance (and presumably clearly significant findings also). This led the authors, David Wendler and Ezekiel Emanuel, to propose research into

whether the public understands the difference between clinically validated tests and research assays, and whether this would change views on requesting feedback; they also propose that research on the positive and negative impacts of receiving feedback from genetic research would usefully inform policy in this area (34).

Debates on this point occurred in various groups, such as the preliminary consultation for Generation Scotland (19), where responses ranged from the clear benefit of early treatment for a curable condition (as had happened for a previous clinical research participant in the group), to news of risk motivating people to live more fully, to it bringing increased stress and repetitive testing, to apathy about other aspects of health as a result of a fatalistic outlook. Both specialists and members of focus groups raised questions about the accuracy and reliability of research derived results, and while the specialists at first appeared to condone a no feedback policy, they remained uneasy and eventually it was suggested that an ethics committee should be set up whose remit would include deciding if/when information would be fed back.

Finally, a study of the provision of feedback in the Anglian Breast Cancer study found that an overwhelming majority of the 1484 women enrolled chose to receive feedback if a particular mutation was found (46). In practice, 16 women were contacted by the time of the interview study and interviews were conducted with 9 of these, as well as with women in whom the mutation had not (yet) been found, and with women who had opted not to receive feedback. All those interviewed reported that they would have been happy to join the study without individual feedback (though, as all the participants had had breast cancer, this may be higher than the norm), and all wanted more information about the findings of the study and were critical that this had not been provided.

Provision of feedback was difficult in practice in three main ways – for those who were told a mutation had been found by the researchers, but where this was not confirmed by the clinical text six months later; in adjusting the focus of counselling when the research showed a mutation, as the counsellor had a 'presumed' positive from the beginning of the process but this might still be confirmed or dismissed; and for telling family members when a mutation had been found – family members would normally be consulted prior to a woman consenting to a clinical test, but in these circumstances this had often not happened making breaking the news considerably more difficult. Richards *et al* conclude therefore that providing individual feedback is not straightforward and can even be difficult and thus should not be the default policy, but that general feedback on the results of the research overall should be provided.

Provision of individual feedback by UK Biobank

The majority of those consulted thought that some form of individual health information should be fed back to participants, though the strength of this view varied. Some felt that it was essentially a right and a moral obligation on the part of researchers to provide it (2,10, 20), others that an initial 'MOT' or health check was a powerful (and acceptable) motivation to participate (10); on the other hand, those more familiar with research saw the sheer scale of providing information on an individual basis to so many people in the right supporting conditions as prohibitive (10). The potential impact of receiving news of an increased disease risk was discussed, with similar variation in response to those described above – however, this could be addressed by offering donors a choice of whether to receive feedback and if so, whether to limit it in anyway (e.g. to curable conditions only) (2,11). Generally, respondents thought that the GP would be the most appropriate person to provide feedback (2), although there were a number of participants and groups who wanted information to be sent directly to them (20).

Consultations on the draft Framework showed strong agreement that results from the initial measures should be fed back, but the most appropriate course for sample analyses and results from later research was less clear for all there was still a preference for feedback to be considered (12,13). As elsewhere, clarity is essential – including on the limitations of any sample analyses to avoid raising false expectations. Participants need to appreciate that they remain responsible for monitoring their own health (10).

Ongoing engagement

Informing participants regularly about results from research was generally both desired and uncontentious, with one suggestion that UK Biobank should hold a sort of "annual shareholder meeting" (10) as knowing whether their participation had in fact been valuable would be important in retaining interest and participation (13). However, there was much less consensus on what 'active participation' and ongoing and meaningful engagement might mean and on how to achieve it - in particular, ensuring that participants are able to affect the direction of research and participate in setting priorities (47), which some saw as an important corollary of asking participants to provide ongoing access to the medical record and to agree to being recontacted (30).

Suggestions made in the consultations on the draft Framework included endorsing the idea of a regular newsletter (sent electronically where possible to conserve resources for research), a website, meetings, canvassing participants' views through the newsletter, an enquiry and complaints helpline and open days (12, 13). Many supported the suggestion of a participant panel, though this should not preclude consulting other participants on specific issues (13). Also, opportunities to sit on the Oversight Body would be welcomed (12).

Research uses

In line with earlier discussion, the public generally distinguishes acceptable and unacceptable uses on the basis of who is conducting the research. So, Höeyer and Lynöe found that reservations were expressed only at a very high level, for example, not using samples in animal research (26). Participants in ELSAGEN focus groups distinguished between a broadly defined category of medical research, which was worthwhile, and other types of research such as into cloning, stem cells, sex selection, designer babies, and genes for intelligence and criminality (30). Wendler and Emanuel found that 91.9% of the 504 people surveyed would not impose greater safeguards on future research into other diseases using stored biological samples. The reasons given included that separating consent for research on cancer and consent for research on other health problems complicated the consent process without offering options participants found ethically meaningful (34).

Schwartz and colleagues (33) studied attitudes to consent to use of stored biological samples in genetic research among the Jewish population. 90% were willing to consent to use of a stored sample for a range of purposes, but were significantly less willing to participate in research that examined stereotypical or potentially stigmatizing traits (such as frugality) as opposed to research that examined medical or mental illnesses (whether preventable or not).

UK Biobank-specific consultations found similar high level concerns, combined with a certain level of trust in *bona fide* researchers to use the resource responsibly – e.g. CRD respondents were willing to contribute samples for 'ethical' research intended to improve the population's health (2); the public panel discussion of the Framework generally found that 'medical research' was specific enough with the focus on ensuring that health benefits are derived from the resource and within that broad scope they were content for access to be provided to researchers from both academic and private sectors (12). OLR workshop

participants sought clarification of 'the public good', asking who would determine what falls within the public good and whether participants would have any involvement in that process. Establishing an oversight body and a participant panel was seen as vital to this (13).

Commercialisation and benefit-sharing

By far, commercial research and the commercialisation of biobank resources were the most consistently and hotly debated use and may present a barrier to participation. There are a number of strands to the debate:

- *Distrust of introducing financial motives to a resource intended for the public good*. For example, participants in the HUNT study proposed that the Norwegian authorities should take responsibility for developing diagnostic devices and therapeutic measures, rather than relying on commercial input and confusing the aims of the study (23). Elsewhere, commercial drivers were seen as incompatible with research to support a health service for the whole population (30).
- *Dissatisfaction with private profit arising from exploiting a public resource*. Focus groups discussing the health and wealth benefits of Generation Scotland raised the perceived unfairness of profit-making from freely donated material, a sense of something being lost through commodification and a feeling of disrespect as a result of commercial use (19). In contrast to blood donation within the health service, where there is an individual-to-individual transaction, in biobank research blood is donated to a resource, enhanced by access to the medical record and provision of lifestyle and environmental data, and the recipients may be major multi-national and profit making organisations; it is therefore reasonable to expect some reciprocal benefit (30).
- *The view that genetic information and results should be publicly owned.* MORI found that even if commercial companies had made a significant expenditure in discovering new ways to use genetic information, more than 70% of the People's Panel still thought that this information should be publicly owned and made freely available without charge (4). Public ownership was taken to mean that the biobank should be publicly owned, controlled by public officials (e.g. through the NHS), or set up as a charity or independent trust. While two groups raised the question of property rights in genes, rather than rights to control what happens to samples, the general view was that genetic data should be viewed as being publicly owned and therefore used for the public good (19).
- *More or less reluctant agreement that investment from pharmaceutical companies is essential to ensure new treatments and diagnostics.* Patient groups were more positive in their attitudes towards commercialisation than other participants in consultations on Generation Scotland, however, many others recognised a need for investment from the commercial sector (19).
- *Limited evidence that commercial access does actually inhibit participation.* Hapgood *et al* used a 'discrete choice experiment' model with their 1238 survey participants to see in which model of biobank they would prefer to participate and found that the most significant inhibitor to participation was commercial access (50). However, Jack and Womack reviewed records to see why patients refused to donate waste tissue for research, to see if use in commercial research was a deterrent (48). Of the 38 refusals from 3140 preoperative patients (1.2%) only two patients cited commercial research as the main reason for refusal. Similarly, a study looking at willingness to consent to blood stored for more than a decade being used in genetic research found that consent was given almost as frequently for industrial research on heredity as for academic research, provided that ethics committee approval had been given and samples were anonymised (49).
- *Profit-sharing models.* Many suggestions have been made for directing some profits back to the community; for example, investment in health services, in research, in the

> biobank, in health charities, in the country; through making drugs cheaper or sharing research results with other companies (19).

Consultations on UK Biobank found that the majority were willing to accept commercial access to the resources after assurances regarding controls on access (e.g., that no one will receive exclusive access, data cannot be sold on and that licenses will be given for specific uses) and discussion of the merits in terms of public health benefits through continued research and development. However, they were also keen to explore some form of benefit-sharing even if only through fees for access, and stressed that transparency and openness in relation to commercial interests in the resource will be critical to earn and maintain trust (2, 10, 12, 13).

Knowledge-sharing as benefit

Publication of results was seen as adding value, credibility, and providing benefit to other population groups in a study of public attitudes to use of medical records in research conducted in South Wales (28). Publication of both positive and negative findings was also strongly supported by the PSP public panel (12), and was seen as a way of opening up use of the resource for public scrutiny.

Governance, trust and oversight

> "Genetic banks represent major proposals for collective action, designed to yield public benefits. It is a matter of course that individuals should be protected in this process. Nonetheless, if their trust is to be won, and if that trust is to be well-founded, much more is needed: precisely those public benefits that are being promised in the first place must be energetically pursued and promoted. And donors are in no position to ensure this: unavoidably they *entrust* this task to one or more institutions. What is required therefore is solid institutional design to coordinate activity in ways that not only avoid harm but actively promote benefits and earn trust." Williams and Schroeder (29)

When asked “who would you trust to be in charge of UK Biobank?” Levitt and Weldon describe how their participants’ first response was laughter; then conceding that it would be necessary to trust someone to be in charge, participants considered what would give an organisation the best chance of being trustworthy. Two approaches emerged: power-sharing, so that no single group would have all the power, and finding a ‘safe pair of hands’ (30). This tendency to trust in specific individuals or groups rather than in institutions or companies to evaluate the risks and benefits of research was mirrored in findings of the Royal College of Surgeons in Ireland – 82% of the public having greatest confidence in doctors and nurses, 70% in hospital and university-based researchers, 60% in ethics committees, and only 28% in health boards and 26% in pharmaceutical companies (5). Similarly, the People’s Panel trusted family doctors, the NHS and the police to use the genetic database responsibly (4).

Consultation on the regulation of human tissue use found that participants were often perturbed to discover that some uses of tissue did not require consent. In this context, they warmly welcomed the proposed Human Tissue Authority and came to a unanimous view on what they thought its core values should be: inclusive (i.e. the membership should include lay people, representatives of religious and ethical groups, scientists, health professionals and possibly government representatives), respectful (of the fact that this is "our bodies they are dealing with"), accountable (open to public scrutiny, accountable to government and overseen by the Health Minister - and independent of the pharmaceutical industry) and informative (both in relation to describing its role and regarding its decision-making) (3).

These values may be instructive for considering the role of the Ethics and Governance Council or Oversight Body.

The UK Biobank Ethics and Governance Council

The consultations on UK Biobank resulted in fairly similar views – that there should be an oversight body was strongly supported by the majority, with minority voices cautioning against bureaucracy and suggesting the project funders are reputable bodies and should take on the role directly (2, 10, 11). Characteristics of the oversight body were that it should be capable of acting independently of users and sponsors, especially given the role of the funders in making the appointments and providing the body's financial resources (10, 12, 13); there should be a genuinely open recruitment process (12); membership should cover a diverse range of backgrounds, including lay people, though religious representation was rejected on balance. Members should be appointed for limited periods of time and should have no financial or other vested interests in the biobank (it was recognised that this might be problematic in recruiting scientists with the relevant expertise) (2, 12). Finally, the OLR workshop participants stressed the importance of the oversight body taking its decisions in public and making them openly accessible (13).

Lay contributions to the oversight body were debated: one model was that the body itself be a panel of lay members supported by professional staff and with the means to consult on specific issues, another that lay members make up part of a diverse committee as above (2, 10), and a third that a lay panel or sub-committee should be set up, sharing the responsibility and workload and allowing people to be co-opted to the oversight body as needed (12). Some people were sceptical regarding how well lay members would be able to contribute without having specialist knowledge (11), whereas others saw their role as asking practical questions. As one respondent expressed it: "I think sometimes medical people and scientists can get lost in a little world of their own without getting their feet on the ground. Maybe someone could hold them down on the ground a bit and show how it affects normal folks." (12) Whether such lay people should be 'educated' or 'professional' people was less clear, but they should not be 'professional' consumers who sit on numerous committees and are no longer representative of 'real' consumers.

The role of the oversight body was conceived as agreeing rules for access and use; guaranteeing the confidentiality and security of samples and data; hearing serious complaints and ensuring the ethical conduct of the resource is maintained (10, 12, 13) and in so doing, balancing fidelity to the terms of the original consent with reflecting the evolving public consensus. It would also agree changes to the Ethics and Governance Framework and should consider setting up a separate financial auditing procedure. On balance, respondents to the draft Framework thought that a body that meets a few times a year, paying expenses or a small allowance and receiving staff reports should be able to meet this aspiration so long as it has the power to challenge those reports (12). However, the relationship with the NHS research ethics committee and other external governance amd regulatory mechanisms should be clarified to avoid duplication of functions.

Recommendations for future work

Context

Four research projects or consultations of particular interest to the Council are currently underway:

- A consultation by the Medical Research Council on uses of personal health information in research being undertaken by the MORI Social Research Institute in response to the

Academy of Medical Sciences' report *Personal Data for Public Good*. Details can be found in the News Views and Events section of the MRC website.

- Generation Scotland is approaching / has begun its second stage of public consultation, with plans described in detail in a paper by Gill Haddow and Sarah Cunningham-Burley (see bibliography). The aim is to explore issues relating to the design, conduct and use of the database with a wide range of audiences.

- The National Human Genome Research Institute (NHGRI), part of the National Institutes of Health (NIH), has awarded $2 million to the Genetics and Public Policy Center of the Berman Bioethics Institute at Johns Hopkins University to conduct a public discussion about future potential large U.S. population-based studies examining the roles of genes and environment in human health. Focus groups and town hall meetings will be held in 5 States, in addition to a national web-based survey of 4,000 individuals and interviews with community leaders.

- The Wellcome Trust commissioned a team from the University of Surrey to undertake an innovative research project on public views on governance of medical research and focusing on identifying the underlying factors that engender trust. This is due to report imminently.

Commissioning

The Council may wish to consider commissioning work on public attitudes, perceptions or expectations of the following under-researched areas:

- Collection of lifestyle data, including areas of concern or sensitivity, particularly for different groups within the intended UK Biobank population

- Mental incapacity and consent to / continued participation in research, including role of family members and ways of enabling capacity to consent

- The impact of providing feedback on disease susceptibility, in both the short and the long-term

- Modes of ongoing engagement with participants – impending recruitment could be an ideal time to seek views of actual participants on what form of engagement they would like with UK Biobank. This may require prior work to identify sustainable and effective options to offer.

Council consideration

A particular aspect that needs further consideration is whether and how UK Biobank participants and members of the public in general might influence the setting of research priorities, and the potential role of the Council in facilitating this. Understandings of the 'public good' – its meaning and scope, and the appropriate way of determining this over the course of the biobank project – could also be explored.

Finally, the Council may wish to consider how public preferences for some form of profit return or benefit sharing can be realized in practice.

References

(1) Office of Science and Technology and the Wellcome Trust. Science and the Public: A Review of Science Communication and Public Attitudes to Science in Britain. 2000.

(2) Cragg Ross Dawson. Public Perceptions of the Collection of Human Biological Samples. 2000.

(3) Opinion Leader Research. Public attitudes towards the use of human tissue in biomedical research. 2004.

(4) MORI. Public attitudes to human genetic information: People's Panel Quantitative Study. 2001.

(5) Royal College of Surgeons in Ireland. Public perceptions of biomedical research: A survey of the general population in Ireland. 2005.

(6) Calnan M, Montaner D, Horne R. How acceptable are innovative health-care technologies? Social Science & Medicine 60 (2005) 1937-1948

(7) Human Genetic Commission. Whose hands on your genes? Analysis of Responses to the tick box summary section. 2001.

(8) Busby H. Blood donation for genetic research. In R. Tutton & O. Corrigan, eds. Genetic Databases: Socio-ethical issues in the collection and use of DNA. London: Routledge. 2004.

(9) Hjörleifsson S, Strand R, Schei E. Health as a genetic planning project: enthusiasm and second thoughts among biomedical researchers and their research subjects. Genomics, Society and Policy 2005, vol 1, no. 3, pp52-65

(10) People Science & Policy Ltd. BioBank UK: A Question of Trust. A consultation exploring and addressing questions of trust. 2002.

(11) People Science & Policy Ltd. UK Biobank Panel [Supplement to A Question of Trust]. 2003.

(12) People Science & Policy Ltd. UK Biobank Consultation on the Ethics and Governance Framework. 2003.

(13) Opinion Leader Research. Summary of the UK Biobank Consultation on the Ethics and Governance Framework. 2003.

(14) Barr M. 'I'm not Really Read up on Genetics': Biobanks and the Social Context of Informed Consent. BioSocieties (2006), 1, 251-262

(15) Goodson ML, Vernon BG. A study of public opinion on the use of tissue samples from living subjects for clinical research. J Clin Pathol 2004; 57:135-128

(16) Kettis-Lindblad Å, Ring L, Viberth E, Hansson MG. Genetic research and donation of tissue samples to biobanks. What do potential sample donors in the Swedish general public thing? European Journal of Public Health, Vol. 16, No. 4, 433–440

(17) Pentz RD, Billot L, Wendler D. Research on stored biological samples: views of African American and White American Cancer Patients. American Journal of Medical Genetics 140A: 733-739 (2006)

(18) McQuillan GM, Porter KS, Agelli M, Kington R. Consent for genetic research in a general population: The NHANES experience. Genet Med. 2003 Jan-Feb;5(1):35-42

(19) Haddow G, Cunningham-Burley S, Bruce A, Parry S. Generation Scotland: Preliminary Consultation Exercise 2003-4. Public and Stakeholder views from focus groups and interviews. 2004.

(20) Shickle D, Hapgood R, Carlisle J, McCabe C, Shackley P, Morgan A. Public attitudes to participating in UK Biobank: A public consultation on issues relating to feedback, consent, withdrawal and access. 2003.

(21) Haimes E, Whong-Barr M. Levels and styles of participation in genetic databases: a case study of the North Cumbria Community Genetics Project. in R. Tutton & O. Corrigan, eds. Genetic Databases: Socio-ethical issues in the collection and use of DNA. London: Routledge. 2004.

(22) Haimes E, Whong-Barr M. Key Issues in Genetic Epidemiology: Lessons from a UK-based empirical study. TRAMES Journal of the Humanities and Social Sciences 2004; 8, 1/2; 150-163

(23) Skolbekken J, Ursin L, Solberg B, Christensen E, Ytterhus B. Not worth the paper it's written on? Informed consent and biobank research in a Norwegian context. Critical Public Health, December 2005; 15(4): 335–347

(24) Trauth JM, Musa D, Siminoff L, Jewell IK, Ricci E. Public attitudes regarding willingness to participate in medical research studies. J Health Soc Policy 2000;12(2):23-43

(25) Ormond KE, Cirino AL, Chisholm RL, Wolf WA. Informed consent for a population based genetic database: a qualitative assessment of understanding. Conference Abstract. 2003

(26) Höeyer K, Lynöe N. Motivating donors to genetic research? Anthropological reasons to rethink the role of informed consent. Medicine, Health Care and Philosophy (2006) 9:81-86

(27) Höeyer K. "Science is really needed - that's all I know". Informed consent and the non-verbal practices of collecting blood for genetic research in Sweden. New Genetics and Society, 2003 Vol. 22, 198-212

(28) Robling MR, Hood K, Houston H, Pill R, Fay J, Evans HM. Public attitudes towards the use of primary care patient record data in medical research without consent: a qualitative study. J Med Ethics 2004; 30: 104-109

(29) Williams G, Schroeder D. Human genetic banking: altruism, benefit and consent. New Genetics and Society, Vol 23, No 1 April 2004

(30) Levitt M, Weldon S. A well placed trust?: Public perceptions of the governance of DNA databases. Critical Public Health, December 2005; 15(4): 311–321

(31) Wendler D. One-time general consent for research on biological samples. BMJ.2006; 332: 544-547

(32) Helgesson G, Ludvigsson J, Gustafsson Stolt U. How to handle informed consent in longitudinal studies when participants have a limited understanding of the study. J Med Ethics 2005; 31: 670-673

(33) Schwartz MD, Rothenberg K, Joseph L, Benkendorf J, Lerman C. Consent to the Use of Stored DNA for Genetics Research: A Survey of Attitudes in the Jewish Population. American Journal of Medical Genetics 98:336-342 (2001)

(34) Wendler D, Emanuel E. The debate over research on stored biological samples: What do sources think? Arch Intern Med. 2002;162:1457-1462

(35) Höeyer K, Olofsson B, Mjörndal T, Lynöe N. Informed consent and biobanks: a population-based study of attitudes towards tissue donation for genetic research. Scandinavian Journal of Public Health 32; 224-229

(36) NHS Information Authority with The Consumer's Association & Health Which?. Share with Care! People's views on consent and confidentiality of patient information. 2002.

(37) Nilstun T, Hermerén G. Human tissue samples and ethics - attitudes of the general public in Sweden to biobank research. Medicine, Health Care and Philosophy (2006) 9:81-86

(38) Matsui K, Kita Y, Ueshima H. Informed consent, participation in, and withdrawal from a population based cohort study involving genetic analysis. J Med Ethics 2005; 31:385-392

(39) MORI. Privacy and Data-Sharing: Survey of public awareness and perceptions. 2003

(40) Macdonald L, Ritchie A. Health on-line: public attitudes to data sharing in the NHS. Scottish Consumer Council. 2005.

(41) Anderlik MR, Rothstein MA. Privacy and confidentiality of genetic information. Annu. Rev. Genomics Human Genet. 2001, 2:401-433

(42) Academy of Medical Sciences. Personal data for public good: using health information in medical research. 2006.

(43) School of Health and Related Research. Patient Electronic Record: Information and Consent (PERIC) - Public attitudes to protection and use of personal health information. 2002.

(44) Rose H. The Commodification of Bioinformation: The Icelandic Health Sector Database. The Wellcome Trust. 2001.

(45) Health Which? & NHS National Programme for Information Technology. The Public View on Electronic Health Records. 2003.

(46) Richards MPM, Ponder M, Pharaoh P, Everest P, Mackay J. Issues of consent and feedback in a genetic epidemiological study of women with breast cancer. J Med Ethics 2003; 29; 93-96

(47) Levitt M. UK Biobank: a model for public engagement? Genomics, Society and Policy 2005, vol 1, no. 3, pp78-81

(48) Jack AL, Womack C. Why surgical patients do not donate tissue for commercial research: review of records. BMJ 2003; 327; 262

(49) Stegmayr B, Asplund K. Informed consent for genetic research on blood stored for more than a decade: a population based study. BMJ 2002;325:634-5

(50) Hapgood R, McCabe C, Shickle D. Public preferences for participation in a large DNA cohort study: a discrete choice experiment. School of Health and Related Research, University of Sheffield. 2004.