The GenomEthics Study
End of Project Report and Evidence of Impact and Reach, 2010-2016

Dr Anna Middleton
Principal Staff Scientist, Ethics Researcher for the DDD Study
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## DDD Ethics Project

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GenomEthics Project Background

Start date: 8th November 2010
Maternity leave: Feb 2012-Jan 2013
End date: 30th September 2016

Full time work on project 08/11/10 - 01/05/15
50% work on the project 01/05/15 – 30/09/16

Total time worked on project, Dr Anna Middleton: 4 years 3 months fte

Research Brief:
Design and deliver a social sciences research study to understand what the public, research participants, patients, health professionals and genomic researchers think should happen with respect to the sharing of incidental findings from genome sequencing research studies.

The principal research question/objective
This is an exploratory study; the objectives are to investigate the following:
- Attitudes towards sharing of ‘pertinent findings’ from whole genome studies
- Attitudes towards sharing of ‘incidental findings’ from whole genome studies
- Attitudes towards receiving information relating to different categories of genomic information
- Attitudes towards the sharing of raw genomic data
- Attitudes towards genomic researchers sharing incidental findings even if this means compromising their ability to answer their research question

1. Design of the GenomeEthics study
Creation of the study
The way the ethics study was structured and designed was open. As delivered in my job interview, I suggested a mixed-methods project that would use an online survey plus series of qualitative interviews to gather data. I titled this the ‘GenomEthics’ study. In order to ensure that the views of the management committee and various stakeholders were represented in the research and more importantly, that the right questions would be asked, I started the research process with an extensive literature review, and used the themes from relevant literatures as a basis for exploration with all stakeholders. This culminated with the production of the Ethics and Genomics study protocol (Appendix A).
Compliance with Data Protection Legislation
As part of compliance with internal Sanger Institute policy I completed the Human Materials and Data Management Committee (HMDMC) paperwork addressing how the research data would be stored, encrypted and protected as per the Data Protection Act. This is particularly pertinent as some identifiable data (Level 4) would be collected from research participants and since this level of data is not routinely held on campus, new pathways needed to be developed, this involved discussion and agreement from David Davison (then COO), Tim Hubbard and Paul Bevan. The HMDMC paperwork has been adjusted several times in line with an evolution of thinking on campus and the latest version of this can be viewed in Appendix B.

Creation of a Lone Worker Policy
In the early stages of the project the intention was to interview research participants off campus. In order to comply with Sanger Institute Health and Safety requirements I created a Lone Worker Policy, which has been risk assessed and endorsed by the Health and Safety team and now adopted as Sanger policy. The aim of this piece of work was to ensure sensible steps were taken to protect myself or any interviewer working in a research setting with members of the public in their own homes or off campus (see Appendix C).

REC approval
After the creation of the study protocol, interview schedule, consent form, participant information sheet and draft survey, in July 2011 I submitted the REC paperwork and received favourable REC approval in August 2011 (Appendix D).

Design of the Online Survey
The creation of the online survey took 9 months and 19 iterations. This involved discussion of content with all stakeholder groups (lay members of the public, parents of children involved in the DDD project, genetic health professionals, clinical scientists, genomic researchers, DDD management committee and Sanger ethics and policy staff). The discussion took a structured format and consisted of a focus group, 4 face validity tests and 5 pilot studies. I also conducted a readability test and reliability testing, to ensure that the bespoke survey was as robustly designed as possible. Appendix E shows the methods employed. This work is written up for publication in the journal Social Sciences Research (detailed below). Within the first nine months of this paper being published, it was downloaded from the Journal’s website 1520 times, thus showing the interest in the study design.
1. 2011-2012

After the background preparation work above, the year 2011-2012 was spent designing the survey, creating the 10 films that sit within it and constructing the recruitment strategy. The films are used as a medium to describe the various ethical issues raised by genomics and are used to offer background information that research participants need in order to answer the questions. The films took 5 months to create from start to finish and involved multiple iterations to get the right balance of information, graphics, filmed footage and voice over. I wrote the scripts for the films and co-directed the filming with Neonotter (professional film making company). I wanted to ensure that the films could be used out of context of the survey and would be appropriate for teaching about genomics and could be applied to ethical considerations about sequencing in both a research and clinical setting. A testimony to the versatility of the films and survey has been demonstrated as they are being used in various teaching settings around the world, for example:

(i) Prof Greg Fowler, founder of Geneforums, uses the films and survey as part of his Public Health Genomics curriculum for doctoral nursing students at Portland State University, USA. He has also used the survey to stimulate debate in a peer reviewed panel discussion at a US Public Health conference in Oregon. The panel session was called: Public
Health and Genomic Medicine: How do get from here to there? and was delivered at the 2014 Oregon Public Health Association Annual Meeting and Conference, the survey was delivered to delegates as part of their pre-conference preparation for participation in the panel.

(ii) Dr Natasha Anwar, Associate Professor from Department of Biological Sciences, Forman Christian College in Lahore, Pakistan has used the films in medical student teaching about genomics.

(iii) Dr Clara Gaff, Program lead of Melbourne Genomics Health Alliance and Prof Sylvia Metcalfe from Melbourne Children’s Hospital, Australia, use the survey and films to teach undergraduate biomedical students and postgraduate genetic counselling students.

(iv) Prof Judith Goodship, Institute of Human Genetics, University of Newcastle uses the survey and films in teaching medical students and also A-level students about genetics.

(v) Mrs Nicola Wilberforce, biology teacher and author of the Salters’ Nuffield Advanced Biology online resources, uses the survey and films as a teaching tool for A-level Biology students and teachers to explore the complex ethics surrounding genomic studies.

(vi) Dr Linda Battistuzzi, biology lecturer from Dept. of Internal Medicine, Genoa University, Italy uses the survey and films to explore ethics with her biology undergraduate students.

The survey (and films) have been adapted and translated by four independent research groups around the world to enable data gathering with different populations:

(i) Danish: Professor Ole Mors, Department of Clinical Medicine, Aarhus University and Aarhus University Hospital, Risskov

(ii) Urdu: Dr Natasha Anwar, Associate Professor from Department of Biological Sciences, Forman Christian College in Lahore, Pakistan

(iii) Spanish: Prof Allesandra Carnevale, Instituto Nacional de Medicina Genomica, Mexico City, Mexico. This work was presented at the European Society of Human Genetics Conference in Milan 2014.

I also consulted experts in social media and recruitment into social sciences research from University of Cambridge as well as from an external Social Media consultancy in order to create the most appropriate participant recruitment strategy. I designed the website that would hold the survey and describe the background to the DDD ethics research (www.genomethics.org) and this was translated and hosted by the WTSI web team. Aside from the survey design, 2011-2012 was spent introducing the project in a public and professional setting via numerous peer reviewed and invited presentations. See final outputs for details.
Video Outputs (10 x varying lengths)
(images are video screen captures. All videos can be found at www.GenomEthics.org under “DDD” study and appear at the portion of the survey indicated by the captions under each)

0.) Introduction to Survey

1.) “Questions about you”
2.) “Sharing of Pertinent Findings”

3.) “Sharing of Incidental Findings”
4.) “Categorizing of Incidental Findings”

5.) “Relations with Risk”
6.) “Raw Data”

7.) “Duty of Genomic Researchers”
8.) “Filter of Genomic Information”

9.) “Consent for Genomic Research”
As part of my role as a social scientist researching ethical issues surrounding sequencing technologies I put myself forward for contribution to various external activities both nationally and internationally. This gave me an opportunity to discuss and debate the work I was doing for the DDD Project, as well as explore practical and ethical issues of relevance to genetic counselling practice:

(i) invited steering group member for NIHR doctoral fellow, Gillian Crawford’s PhD project at Southampton University and contributed to discussion about consent and sharing incidental findings;
(ii) invited member of the Wellcome Trust’s Health Related Findings mapping exercise and contributed to their policy creation on sharing incidental findings in research studies across the UK;
(iii) invited to present to the Human Genetics Commission (before it was disbanded) on the ethical impact of sequencing technologies;
(iv) invited to be an associate research fellow at the Public Health Genomics Foundation and have participated in their Realising Genomics think tank piece of work exploring the implementation of sequencing in clinic;
(v) invited ‘ethics advisor’ to the EBI to explore why a grant had been turned down because the ethical issues had not been addressed, offered advice for a future application;
(vi) member of the Genome Campus ‘Society and Personal Genomics’ (SPG) project and as part of this structured the campus genotyping project and wrote up the proposal for consideration by the Board of Management, co-wrote up the REC application, also defended the project in front of the REC. Also co-ordinated and hosted the Social Scientist in Residence sabbatical position for Prof Barb Biesecker and Prof Les Biesecker to visit the Genome Campus for 2 weeks as part of SPG activities;
(vii) invited member of the Human Materials and Data Management Committee HMDMC Special committee to review applications for work on campus that have an interesting ethical dimension or that have not obtained conventional ethical approval (have worked on 20 proposals to date);
(viii) invited chair of the Transnational Alliance of Genetic Counsellors in Montreal as part of the International Congress of Human Genetics and American Society of Human Genetics conference;
(ix) Completed 6 year term (finished June 2011) as vice-chair of the Genetic Counsellor Registration Board UK + ROI - overseeing competency to practice and registration of genetic counsellors in the UK;
(x) Completed 6 year term as Chair of the Overseas Registration of Genetic Counsellors Working Group (finished June 2011);
(xi) invited co-chair of the International Genetic Counsellor Credentialing Committee, position involved chairing a meeting at the American Society of Human Genetics on the Registration and Certification presidents from UK, USA, Canada, Japan, S. Africa, Australasia;

2. 2012-2013
In January 2012, together with the media team at the Wellcome Trust Sanger Institute, I wrote a press release that would be used as a basis to invite members of the news, radio and written press to report on the ethics study. The aim of this was to promote the online survey and enhance recruitment into the research. I was interviewed about the study for Channel 4 news, BBC Look East news, BBC Radio Cambridgeshire breakfast show and Naked Scientists show, Radio 4 Material World. The focus of this media work was to talk about the GenomEthics study and invite participation in the online survey.

From February 2012 – January 2013 I was on maternity leave. While I was off I arranged for a poster on the ethics study to be presented at three conferences (see outputs for details), I also finished off the necessary proofing required to get the book, with Oxford University Press, into press. I also promoted the online survey where possible so that participants could be recruited into the study in my absence.

3. 2013-2014
Throughout 2013 after returning from maternity leave I spent the first 5 months doing a social media push to encourage recruitment into the survey. This involved creating a blog where I could discuss current issues in genomics (www.genomethicsblog.org), within the blog page was a large hyperlinked image of the GenomEthics survey together with an invitation to participate in the survey. I also created a Twitter account (@genomethics), a Facebook page (https://www.facebook.com/Genomethics), a LinkedIn account (https://www.linkedin.com/pub/anna-middleton/64/17/895) and my own personal website (www.annamiddleton.info). The aim of all of these social media outlets was to create an environment where I could actively discuss the survey and related issues and use this activity to increase participation in the study. I posted messages on LinkedIn, Facebook, Twitter and the blog and I also wrote blog posts for the Wellcome Trust, the charity Swan and the charity Unique. This active online debate and promotion was successful and resulted in an increase of participants from 2000 to 7000, with input from 91 different countries across the world. The social media strategy was novel and (as far as I’m aware) had not been done before in this way within social sciences research, I was invited to present this method of recruitment at the HeLEX department, University of Oxford and also at the Sanger Institute (see outputs for details).

I wrote up a second methods paper (see outputs) on the recruitment strategy, together with an overview of the resultant study sample obtained, which was published in Journal of Community Genetics. According to the Journal of Community Genetics website, as of June 2014, this was the third most popular article they had published and through sharing via Twitter had been made available to 61,000+ followers.

The recruitment strategy was incredibly successful and resulted in over 11,000 hits on the survey. After the data had been cleaned this left just under 7,000 surveys where over 75% of the questions had been completed. All four different stakeholder groups were represented (members of the public, n = 4961; genomic researchers, n = 607; genetic health professionals, n = 533; other health professionals, n = 843).

I worked with statistician Dr Kate Morley from Kings College London to fine-tune the statistical analyses. I then began to present the first set of analysis at various conferences in the UK and overseas (see outputs). I also did more media interviews on the ethical implications of sharing genomic data for TV (Royal Society of Science Festival, Wellcome Trust Sanger Institute public engagement material), radio (BBC World Service, Polish Radio) and interviewed for newspaper articles (Observer, Daily Mail, Telegraph, Irish Times) and this time I was able to present some of our own data from the ethics study.

1. 2015-2016

The focus group arm of the study as designed, patient invitation letters, consent forms and a SOP was developed for recruitment. The actual invitation to participate had to be sent by an NHS health professional and this involved a DDD research nurse or clinician checking patient records to make sure that the address was still current and that family circumstances hadn’t changed (e.g. a child died). Unfortunately, due to logistical reasons, this was not straightforward. Thus in the time available, only 1 focus group with DDD parents has been possible. I am available and willing to do more focus groups in the future, if and when this logistical issue resolves. While I was waiting for the focus groups to materialise, I spent time writing up the remaining papers on the project and publicising the
results nationally and internationally through conferences and media/online opportunities.

As an extension of my role as DDD Ethics Researcher I have been invited to contribute nationally and internationally as an expert on ethics/genomics issues: (i) invited to chair the Association of Genetic Nurses and Counsellors working group to create and publish a position paper on opportunistic genomic screening on behalf of British genetic counsellors (see outputs for publication that appeared in the European Journal of Human Genetics and Appendix I); (ii) invited Board moderator for the registration of genetic counsellors in the UK; (iii) Vice-Chair of the Association of Genetic Nurses and Counsellors, representing genetic counsellor interests nationally; (iv) invited plenary speaker at the Human Genetics Society of Australasia, 2013, 2014, to present DDD ethics project and own vision for genetic counselling research; (v) Invited teacher on the Wellcome Trust Advanced Courses for professionals programme: Fundamentals of Genetics Jan 2014, Molecular Pathology and Diagnosis of Cancer, teaching about incidental findings; (vi) Invited with other colleagues from the Sanger Institute to input genomics knowledge into the teaching curriculum for health professionals via the NHS National Genetics and Genomics Education Centre, Birmingham; (vii) filmed a series of short pieces on ethics for the NHS e-learning modules on bioinformatics, created by NOWGEN and the NHS Genetics Education Centre; (viii) invited to be an Expert Adviser to Oxford Desk Reference Clinical Genetics by Firth HV and Hurst JA 2nd edition to be published by OUP 2013. Reviewed the text on Communication. (ix) One of seven invited members of the European Molecular Biology Laboratory’s Human Data Committee, established to advise the Director General (Heidelberg) and the Director of the EMBL-EBI (Cambridge) on questions arising in relation to accepting, storing and providing access to data related to human research subjects (2013 - present). (x) Invited reviewer for numerous genetics journals, e.g. PLOS ONE, Journal of Genetic Counselling, American Journal of Medical Genetics, Community Genetics, Clinical Genetics, Twin Research and Human Genetics; (xi) invited by the Public Engagement team at the Wellcome Trust Sanger Institute to help design the ‘ethics’ component of the Sanger stand at the Royal Society Festival of Science, July 2013. We utilised a multi-media approach - consisting of film with actors asking a series of ethics questions delivered on a large TV screen, a second screen delivering a question that visitors could press buttons to answer and a use of several projectors that beamed down genetic ‘traits’ as words onto visitor’s clothes. Exhibition was designed to run concurrently with a similar exhibition at the Smithsonian Museum in Washington DC.
In 2015 I was offered a core-funded position setting up social science research for the Wellcome Genome Campus and from 1st October 2016 now run this as Head of Society and Ethics Research, Connecting Science at Wellcome Genome Campus.
GenomEthics
Impact and Reach of Work

1. Peer Reviewed Journal Articles
2. Mentions of the GenomEthics Study in Select Peer Reviewed Journals and Policy
3. Peer Reviewed Conference Presentations
4. Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study
5. Video, Museum Exhibits and Teaching Materials Based on Outcomes of the GenomEthics Study
6. News Coverage and Media Referring to the GenomEthics Study
7. Blog and Online Journal Articles Referring to the GenomEthics Study
8. Social Media
Interpreting Altmetric Scores and Data

**Altmetrics** are metrics and qualitative data that are complementary to traditional, citation-based metrics. They can include (but are not limited to) peer reviews on Faculty of 1000, citations on Wikipedia and in public policy documents, discussions on research blogs, mainstream media coverage, bookmarks on reference managers like Mendeley, and mentions on social networks such as Twitter. Altmetric searches for data from a broad range of sources using DOIs and then collates that data into an “Altmetric Attention Score”.

The colours in the doughnut represent various types of media (as indicated below the doughnut), the more colourful the doughnut the more varied types of media that article has reached.

<table>
<thead>
<tr>
<th>Source</th>
<th>Weight</th>
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<tbody>
<tr>
<td>News</td>
<td>8</td>
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<tr>
<td>Blogs</td>
<td>5</td>
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<tr>
<td>Twitter</td>
<td>1</td>
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<tr>
<td>Facebook</td>
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<tr>
<td>Sina Weibo</td>
<td>1</td>
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<tr>
<td>Wikipedia</td>
<td>3</td>
</tr>
<tr>
<td>Policy Documents (per source)</td>
<td>3</td>
</tr>
<tr>
<td>Q&amp;A</td>
<td>0.25</td>
</tr>
<tr>
<td>F1000/Publons/Pubpeer</td>
<td>1</td>
</tr>
<tr>
<td>YouTube</td>
<td>0.25</td>
</tr>
<tr>
<td>Reddit/Pinterest</td>
<td>0.25</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>0.5</td>
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</tbody>
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The score, located in the centre of the doughnut, is derived from an automated algorithm, and represents a weighted count of the amount of attention we’ve picked up for a research output. It is weighted to reflect the relative reach of each type of source (to account for the fact that the average newspaper story is more likely to bring attention to the research output than the average tweet).

The default weightings are as follows:
"Attention Score in Context" shows where that particular output ranks in relation to all research outputs, other outputs from the same publication and where it specifically ranks in relation to other outputs of a similar age.

It is possible to drill down to see the specific instances that the output appeared in various media (in the below example, the “News” tab is shown) and then follow the link back to the story at its original source.
Middleton A, Bragin E, Morley KI, Parker M on behalf of the DDD Study (2014) Online questionnaire development: using film to engage participants and then gather attitudes towards the sharing of genomic data. Social Science Research 44: p211-223 (Altmetric data gathered 20 Sept 2016)
Middleton A, Bragin E, Parker M on behalf of the DDD Study (2014) 


**Main Project Paper (included for comparison)**

Mentions of the GenomEthics Study in Selected Peer Reviewed Journals and Policy


- Spoke at report launch during session called “Data initiatives in biomedical research”
- Wrote blog entry to coincide with launch
Contacted by Deloitte to consult on their forthcoming Office for Life Sciences policy report on the Genomics market across Europe, an expansion on their already published study on the Genomics market in the UK (image below), July 2016


Peer Reviewed Conference Presentations
(section 3 of 8)

Genetics 20(1). EP08.03. Poster presentation.


Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study


Middleton A (2016) Ethics and Genomics. Teaching on the Wellcome Trust Advanced Course for professionals: Molecular Pathology and Diagnosis of Cancer, Genome Campus, Hinxton, Cambridge, 14th November


Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study
(section 4 of 8)


Middleton A (2016) Gathering attitudes from the public towards data sharing: survey and films. CHIPME meeting, 21st May, Barcelona, Spain


Middleton A (2016) Invited chair and organiser of the credentialing session for Transnational Alliance of Genetic Counselling (TAGC) Fourth International Meeting. The Global State of Genetic Counselling, 19th May, Barcelona, Spain

Middleton A (2016) Teaching on 2nd year MSc Genetic Counselling course, Cardiff University, 3 hours: Ethics of Genomics and Working with Deaf Clients. 6th May, Cardiff.


Middleton A (2015) Ethics and Genomics. Teaching on the Wellcome Trust Advanced Course for professionals: Molecular Pathology and Diagnosis of Cancer, Genome Campus, Hinxton, Cambridge, 24th November
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study (section 4 of 8)


Middleton A (2015) Ethics and Genomics. Teaching on MSc Genetic Counselling course. Cardiff University. 8th May


Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study

Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study


Middleton A (2014) What is ‘personal genomics’? teaching on the Societal Issues and Personal Genomics course for Biological Sciences third year degree students at University of Melbourne, Melbourne, 7th August


Middleton A (2014) DDD project: Molecular study overview and Ethics overview. Delivery to Peter Goodhand, Executive Director, Global Alliance; Mark Bale, Deputy Head of Health Science and Bioethics, Department of Health; Michael Dunn, Head of Genetic and Molecular Services, Wellcome Trust. Cambridge, 23 May


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DDD/Ethics Project
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study (section 4 of 8)

Middleton A (2014) panel discussion together with Sir Mike Stratton and Baroness Helena Kennedy on medical genetics. Names Not Numbers festival of ideas, Aldeborough, Suffolk, 23-25 March
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study (section 4 of 8)

Middleton A (2014) Sanger and EBI staff participation in the Genomethics study, your attitudes towards sharing incidental findings from genome research. Wellcome Trust Sanger Institute, Cambridge. 24th January

(Sketch note created by presentation participant Dr. Jennifer Cham to illustrate what was covered)

Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study (section 4 of 8)


Middleton A (2013) Genomics, ethics: what’s all the fuss about incidental findings? Sheffield Institute of Biotechnological Law and Ethics at Sheffield University, 27th November
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study

(section 4 of 8)

Middleton A (2014) winner on I’m a scientist get me out of here!, a Wellcome Trust supported national event to connect students aged 11-18 with real scientists, March 2014

Middleton A (2013) Genomics, ethics and what people want to know. Teaching on the Wellcome Trust Advanced Course for professionals: Molecular Pathology and Diagnosis of Cancer, Genome Campus, Hinxton, Cambridge, 15th November

Middleton A (2013) What’s all the fuss about incidental findings? Genethics Club Plenary presentation. Addenbrooke’s Hospital, Cambridge, 8th November
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study (section 4 of 8)

Middleton A (2013) Genomics, ethics and what people want to know. Teaching on the University of Cambridge and Life Technologies training event: ‘Genomics in Medicine’ September 27th, approved by the Federation of the Royal Colleges of Physicians

Middleton A (2013) Tweeting, blogging and just plain winging it: utilising social media to recruit into social sciences research. HeLEX Centre for Health, Law and Emerging Technologies, University of Oxford, 9th September


GENOMETHICS

DDD/Ethics Project
Invited Presentations, Seminars, Book Chapters and Teaching that Includes Work on the GenomEthics Study

(Section 4 of 8)


Middleton A (2011) Genethics: whole genome studies, incidental findings and the DDD project. Invited seminar for the East Anglia Regional Genetics Service, Addenbrooke’s Hospital, Cambridge, 14th April

Middleton A (2011) Invited panel member of Personal Genomics Debate at Cambridge Next Generation Sequencing Day, Centre for Mathematical Sciences at University of Cambridge 28th March

Middleton A (2011) The Ethics of Genetics: an exploratory study on the views of patients and health professionals involved in the DDD project. Invited seminar at the Wellcome Trust Sanger Institute, Cambridge, 18th Feb
Video, Museum Exhibits and Teaching Materials Based on Outcomes of the GenomEthics Study

Invited presentation given to the UK Biobank Ethics and Governance Council, 2014
(video screen captures, full video viewable at: https://www.youtube.com/watch?time_continue=47&v=jGz02hCrrPo)
Invited Interview with Genomics Education Programme, Health Education England, 2016. Used for training health professionals
(video screen captures, full video viewable at: https://www.youtube.com/watch?v=sKIMp4XAh7U)
Interviews on ethics and genomics, 2014 for teaching on:
• NHS National Genetics and Genomics for Healthcare website
• Health Education England and NOWGEN e-learning course on bioinformatics 2014
• 7 x videos produced
(video screen captures, full videos viewable on playlist at: https://vimeo.com/92617962)
Video, Museum Exhibits and Teaching Materials Based on Outcomes of the GenomEthics Study

(Section 5 of 8)

Genomics Education Programme & Health Education England 2015

Course on Taking Consent for 100k Genomes Project

- Co-writer of core curriculum
- Co-Creator of 6 x videos produced as course teaching aids

(literature screen captures, full PDF document viewable at: https://www.genomicseducation.hee.nhs.uk/images/pdf/HEEConsentCoursePDF_Dec15-final.pdf)
The videos from the Genomethics survey were used by Genomics England on their website to help website visitors engage with ethical issues.

The Science Museum exhibit “How is Gene Editing Transforming Medicine?” Installed October 2016 using input from Anna Middleton’s research.
Helped design the ‘ethics’ component of the Sanger stand at the Royal Society Festival of Science, July 2013, utilising a multi-media approach consisting of film with actors asking a series of ethics questions. This was delivered on a large TV screen and visitors could press buttons to answer the questions. Several projectors beamed down genetic ‘traits’ as words onto visitor’s clothes. The exhibition was designed to run concurrently with a similar exhibition at the Smithsonian Museum in Washington DC which utilised the same video.
News Coverage and Media Referring to the GenomEthics Study
(section 6 of 8)

Channel 4 News, 31 January 2012
Mix media - Online article with video interview
(reader reaction captured 17 October 2016)
Do you want to know what diseases lie in store? - Presented by Krishnan Guru-Murthy

Dr Anna Middleton

What do you think?
Get in touch on Facebook or via Twitter @channel4news and your thoughts could be featured below.

Valerie Callen: "I would not want to know. Why would I want to spend my whole life worrying about dying, which is inevitable anyway? I say, live and happy living!"

James Snowden: "There's something a little bit 'playing god' about any kind of genetic profiling. How long until parents can decide to abort children because of a high diabetes risk? Frankly I'm all for this though - let's go the whole way and bring on designer babies and mechanical organs. Yay modern medicine."

John Hickman: "I'd love to know, so I can do all I can to avoid nasty conditions but I think there also needs to be very capable information available on the implications of findings when discovered, almost a counselling service."

Colin Robinson: "In my opinion this will no doubt come down to monetary terms in the long run...insurance companies and care providers will use this information...I have no problem with people knowing what the risks for themselves are. They can use it to make informed decisions on lifestyle and parenting and so on. The real problem for me is whether we will be disadvantaged/prejudiced against because of the same information."
News Coverage and Media Referring to the GenomEthics Study
(section 6 of 8)

BBC Look East News, 1 February 2012
Mix media - Online article with video interview
Sanger Institute’s big gene survey to test public’s view - Presented by Mike Cartwright

A genetics survey has been set up online to find out how many people want to know what medical conditions they may face in the future.

The survey is being conducted by the Sanger Institute in Cambridge, which played a big part in mapping the human genetic code.

By examining DNA, doctors can tell if people are likely to develop medical conditions like diabetes, Alzheimer’s and cancer. The institute is trying to establish whether or not people would want to know.
Channel 4 News, 14 June 2013
DNA link to Prince William's Indian Ancestry by Asha Tanna

Breach of privacy?

But the revelation which made the front page of the British newspaper the Times has been criticised by some in the field of genetics, who say not only is it a breach of privacy towards the prince, but also distasteful that the newspaper ran an advert of the company doing the testing at the same time.

Writing for the website The Conversation, Dr Anna Middleton, ethics researcher and genetic counsellor at the Wellcome Trust Sanger Institute, said: "Genetics unites all of us. But revealing personal information about somebody, without their consent, irrespective of their position or status, is potentially harmful.

"While the discussion is about ancestry today, it could be more serious if predispositions to life-threatening conditions are revealed. If it were me, I'd rather know this first and have a chance to talk to my family before anybody else knows about it."

Channel 4 News, 7 November 2013
Database seeks volunteers to bare all - genetically by Emma Maxwell

Database seeks volunteers to bare all - genetically
News Coverage and Media Referring to the GenomEthics Study
(section 6 of 8)

BBC Radio 4, 2 February 2012
Radio interview
Discussion of a survey of ethical attitudes to sharing genomic information from the show Material World featuring Quentin Cooper

BBC Radio Cambridgeshire, 17 April 2013
Radio interview
Introduction on research on Incidental Findings on Pail Stainton Bigger Breakfast Show
News Coverage and Media Referring to the GenomEthics Study

(section 6 of 8)

Genetics and Ethics interview from the show
Interviewed by Dr. Kat Arney for the show A hundred thousand genomes

Do you want to know what's in your DNA?
Interviewed by Chris Smith for the show Safety at 40,000 Feet
News Coverage and Media Referring to the GenomEthics Study
(section 6 of 8)

Keeping your genome safe
Interviewed (along with Guy Coates) by Graihagh Jackson for the show The Future of Medicine

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![Image of The Naked Scientists website](image-url)
Blog and Online Journal Articles Referring to the GenomEthics Study
(section 7 of 8)


In the growing area of personalized medicine, even healthy people have a strong interest in their susceptibility to disease now that genomic research has scaled down economically to the individual level. A study done by the European Journal of Human Genetics reports 98 percent of stakeholders in a nearly 7,000-person research cohort wanted to know about preventable life-threatening conditions revealed through genetic screening.
Blog and Online Journal Articles Referring to the GenomEthics Study
(section 7 of 8)

Wellcome Trust Sanger Institute (2015). Most people eager to know the secrets of their genetics. Picked up by the following sources:

15 Minute News [online]. [Accessed in 2015]

Wellcome Trust Sanger Institute (2015). Most people eager to know the secrets of their genetics. Picked up by the following sources (continued):

**Science Codex** [online]. Available at http://www.sciencecodex.com/most_people_eager_to_know_the_secrets_of_their_genetics-156171 [Accessed 30 Apr. 2015]

Blog and Online Journal Articles Referring to the GenomEthics Study

Wellcome Trust Sanger Institute (2015). Most people eager to know the secrets of their genetics. Picked up by the following sources (continued):


Wellcome Trust Sanger Institute (2015). Most people eager to know the secrets of their genetics. Picked up by the following sources (continued):


Wellcome Trust Sanger Institute (2015). Most people eager to know the secrets of their genetics. Picked up by the following sources (continued):

**Medical News Today MNT [online]. Available at**

**Regator Only the Best Blogs [online]. Available at**
http://regator.com/search/Most+people+eager+to+know+the+secrets+of+their+genetics/ [Accessed on 14 Nov. 2016]
News Staff. 98 Percent Want to Know if Genetic Data Contains a Serious Preventable or Treatable Disease. Science 2.0 [online]. Available at http://www.science20.com/news_articles/98_percent_want_to_know_if_genetic_data_contains_a_serious_preventable_or_treatable_disease-155224 [Accessed in 15 Nov. 2016]

News Staff. 98 Percent Want to Know if Genetic Data Contains a Serious Preventable or Treatable Disease. Picked up by the following source:


Blog and Online Journal Articles Referring to the GenomEthics Study

(sections 7 of 8)

Press Association (2015). DNA feedback ‘no one size fits all’. Picked up by the following sources:


Press Association (2015). DNA feedback ‘no one size fits all’. Picked up by the following sources (continued):

**Jersey Evening Post**
[online]. [Accessed on 30 Apr. 2015]


A major international survey of almost 7,000 people has revealed significant differences in the view of potential genomic research participants and genetic health professionals on feedback of incidental findings (IFs).

IFs are unexpected but medically significant results that occur during investigations for research or clinical purposes. They are by no means unique to genomic analysis, but with the relatively recent advent of whole genome sequencing, they are a significant issue both for large-scale genomic research and clinical implementation.

Published in the *European Journal of Human Genetics*, the survey is the work of researchers at the Wellcome Trust Sanger Institute, and linked to the *Deciphering Developmental Disorders* (DDD) project. Respondents fell into four different categories: genomic researchers, genetic health professionals, non-genetic health professionals, and the public. Significant differences were observed between the views of people from these different categories, although not between those of people from different countries. The views of the public and genetics health-professionals showed the greatest divergence.

Whilst 98% of the public wanted to know about the possibility of preventable, life-threatening disorders, genetic health professionals were five times more likely to think that incidental findings should not be reported. The researchers say that this disconnect should be explored and addressed by researchers and clinicians, and taken into account in future policy development.
Pedersen, T. (2015). Most People Want to Know Secrets of Their Genetics. Picked up by the following source:


European Society of Human Genetics press release (2015). People want access to their own genomic data, even when uninterpretable. Picked up by the following sources:


Medical Xpress [online]. [Accessed on 7 June 2015]
European Society of Human Genetics press release (2015). People want access to their own genomic data, even when uninterpretable. Picked up by the following sources (continued):

Blog and Online Journal Articles Referring to the GenomEthics Study

(Section 7 of 8)

European Society of Human Genetics press release (2015). People want access to their own genomic data, even when uninterpretable. Picked up by the following sources (continued):


Commenting on this, the researcher who undertook the analysis, Anna Middleton of the Wellcome Trust Sanger Institute, is quoted as saying: “The advent of fast, efficient genetic sequencing has transformed medical research over the past decade and it’s set to revolutionise clinical care in the future. Policy surrounding the use of genetic data in research and clinical settings must be directed by the views and experiences of the public, patients, clinicians, genetic health professions and genomic researchers. This study represents a first step in informing people of the issues and gathering their responses.”

The outcome of the survey and its analysis has been published in *European Journal of Human Genetics*. The research paper is titled “Attitudes of nearly 7000 health professionals, genomic researchers and publics toward the return of incidental results from sequencing research.”
Blog and Online Journal Articles Referring to the GenomEthics Study
(section 7 of 8)


Blog and Online Journal Articles Referring to the GenomEthics Study
(section 7 of 8)


9 Feb. 2015 - Invited to participate in GenomeSeqWeek at Genetic Alliance to take over the Genetic Alliance Twitter account for an hour along with Vivienne Parry OBE.
Facebook

Social Media
(section 8 of 8)

Facebook

GENOMETHICS

DDD/Ethics Project
Facebook (continued)
Social Media
(continued)

Facebook

POSTED BY
- Anyone
- You
- Your Friends
- Your Friends and Groups
- Choose a Source...

TAGGED LOCATION
- Anywhere
- Cambridge, United Kingdom
- Potomac, MD
- Choose a Location

Sheer Sweets: Our voice is NEVER heard. Our children are just "numbers" on your list. It's what works for you and not our children!
March 18, 2013 at 7:15pm - Like

Dawn Lauton: Shared with who?
March 18, 2013 at 7:22pm - Like

Shelley Pearce: I AGREE SHAKEELA!
March 18, 2013 at 7:29pm - Like

Heather Varnye: That is thoughtful to make sure parents are being educated and to ensure they are given the correct knowledge.
March 18, 2013 at 7:33pm - Like

Janine Hill: Just taken the survey and liked the page. Very interesting. Have your say on information you would like to receive about your genetic condition x
March 18, 2013 at 8:10pm - Like

Naomi Moodie: I wish I had known about Unique when my daughter was alive, good on you for doing this
March 18, 2013 at 8:28pm - Like

Lien Dier: in scotland mummy is just a number 2q24.2 del. I am sick of asking for info and help and getting nothing. What will make this different
March 18, 2013 at 8:30pm - Like

Audrey Batchelor: I don't understand it all?
March 18, 2013 at 8:47pm - Like

Sheer Sweets: Thank you Shelley. We can only help ourselves as the so called "professional" turn a blind eye! Our children's file are put in their tray and left. I have and still continue to struggle to find the right answers (if there is one) and I continue to educate myself with my son's disorder.
March 18, 2013 at 8:55pm - Like

Jann Hayman: The survey is informative and is designed so that we (family affected by a chromosomal disorder) can have a say in how information is handled and ask what it is we want to know, when, and to what extent.
March 18, 2013 at 9:34pm - Like

Marina Jeffs: What is DDD one of the questions had a reference to this date research group,... I would prefer not to do the questionnaire again just to get the web address for didd
March 19, 2013 at 4:42am - Like

Marina Jeffs: My daughter's deletion has never been reported on or Studied... so very little info on its implications.
March 19, 2013 at 4:44am - Like
Social Media
(section 8 of 8)

Facebook (continued)

Molecular Creativity

European Journal of Human Genetics - Abstract of article: Attitudes of nearly 7000 health...

The European Journal of Human Genetics is the official Journal of the European Society of Human Genetics, publishing high-quality, original research papers, short reports, News and Commentary articles and reviews in the rapidly expanding field of human genetics and genomics.

NATURE.COM

Research Ethics

Potential research participants support the return of raw sequence data -- Middleton et al. 52...

Health-related results that are discovered in the process of genomic research should only be returned to research participants after being clinically validated and then delivered and followed up within a health service. Returning such results may be difficult for genomic researchers who are limited...

 Médicos Psiquiatras

El 98% de las personas ansia conocer los secretos de su #Genética

See Translation

European Journal of Human Genetics - Attitudes of nearly 7000 health professionals, genomic...

The European Journal of Human Genetics is the official Journal of the European Society of Human...
Facebook (continued)

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About
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Orphanet-Italia
July 10, 2015

UNO STUDIO SULLA PROPENSIONE A FORNIRE AI PAZIENTI I DATI DEL SEQUENZIAMENTO

Un articolo pubblicato sul Journal of Medical Genetics illustra l'etica e la responsabilità dei ricercatori in merito a come fornire ai pazienti informazioni sul sequenziamento del genoma. Gli autori affermano che i risultati relativi alla salute scoperti durante un progetto di ricerca sul genoma dovrebbero essere forniti solo a chi ha partecipato allo studio, "solo dopo che questi siano stati validati da un punto di vista clinico e quindi riassestati e ulteriormente sviluppati nell'ambito di un servizio sanitario". Tuttavia, gli stessi autori comprendono che fornire questo tipo di informazioni, potrebbe essere difficile per i ricercatori, limitati dalle risorse e dall'accesso a strumenti clinici adeguati. Gli autori analizzano la propensione di oltre 7.000 persone tra ricercatori, professionisti della genetica e professionisti del settore sanitario non genetisti chiedendo cosa farebbero con questi dati, qualora venissero forniti loro. Il risultato è stato che il 62% dei partecipanti all'indagine avrebbero avuto interesse ad utilizzarli per cercare di fornire la propria interpretazione clinica. In conclusione, sebbene gli autori non promuovano al momento la comunicazione di questi dati, soprattutto in considerazione dell'attuale incertezza interpretativa, ritengono tuttavia necessario un dibattito etico approfondito sul tema per creare un quadro etico che possa guidare la policy su come rendere disponibili i dati del sequenziamento.

Potential research participants support the return of raw sequence data. - PubMed - NCBI
NCBI. NLM. NIH. GOV | BY MIDDLETON A. ET AL.

Summer internship for INigenous peoples in Genomics - SING
April 29, 2015

British Study. 7000 people polled would like their incidental genetic findings returned to them. http://www.nature.com/.../vaop/ncurrent/full/ejhg201558a.html...
Social Media
(continued)

Joanne Loves Science

Many say if researchers using their genetic data find hints of a serious preventable or treatable disease, they’d want to know. A survey of nearly 7,000 people from 75 countries reveals that 98% would want to be informed if researchers using their genetic data stumble upon indicators of a serious preventable or treatable disease. The study, published in the European Journal of Human Genetics, offers the largest dataset, published to date, of attitudes towards issues surrounding the return of incidental findings from sequencing research. Read the full open access article: http://bit.ly/1QbX2jj

Your DNA, your views
A survey of nearly 7000 people has revealed that 98 per cent want to be informed if researchers using their genetic data stumble upon indicators of a serious...

OHSU Bioinformatics and Computational Biology

“This finding demonstrates a disconnect between the views of those handling the findings of research and those participating in research” - Results of survey on incidental findings

European Journal of Human Genetics - Attitudes of nearly 7000 health professionals, genomics...

The European Journal of Human Genetics is the official Journal of the European Society of Human Genetics, publishing high-quality, original research papers, short reports, News and Commentary articles and reviews in the rapidly expanding field of human genetics and genomics.

nature.com
Facebook (continued)

A survey of nearly 7,000 people from 75 countries reveals that 98% would want to be informed if researchers using their genetic data stumble upon indicators of a serious preventable or treatable disease. The study, published in the European Journal of Human Genetics, offers the largest dataset, published to date, of attitudes towards issues surrounding the return of 'incidental findings' from sequencing research. Read the full open access article online: http://bit.ly/1F1YLoc
Appendices

1. Appendix A: Original Protocol for Ethics and Whole Genome Studies (written in 2011)
2. Appendix B: Data Protection Registration
3. Appendix C: Lone Worker Policy
4. Appendix D: Favorrable REC Opinions
5. Appendix E: Creation of a Bespoke Survey
Appendices

Appendix A: Original Protocol for Ethics and Whole Genome Studies (written in 2011)

**Summary of the study**
The Deciphering Developmental Disorders (DDD) project uses the latest whole genome technologies to investigate 12,000 children with undiagnosed developmental delay from every Regional Genetics Service in the UK. The aim of this is to identify new genetic causes for developmental disorders. However, because the research involves looking at the whole genome (all of a person’s genes), it is inevitable that clinically significant, but ‘incidental’, findings will be uncovered in some research participants. For example, a predisposition to developing adult-onset breast cancer may be found in a two-year-old. Such a finding is unlikely to be related to the developmental disorder and yet could still be clinically significant to the child in later life as well as to other family members. As yet there are no published large-scale studies that have gathered empirical data on views about sharing incidental findings from whole genome studies; we aim to address this.

Our objective is to ascertain the views of research participants from the DDD project, genomic researchers, genetic health professionals, laboratory staff and members of the public. Our questions focus on attitudes towards sharing incidental findings, how such findings could be categorized, what to do with findings of unknown significance, attitudes towards mining specifically for certain types of incidental findings as well as views on consenting procedures. Quantitative and qualitative research methods are used to explore the above issues.

**Summary of main issues**
The Deciphering Developmental Disorders (DDD) project uses the latest whole genome technologies to investigate 12,000 children with undiagnosed developmental delay and their parents from each of the 23 Regional Genetics Service in the UK. This project has already gained multi-centre Research Ethics Committee approval (number: 10/H0305/83) as well as NHS Research and Development Approval across all involved NHS sites in the UK.

The ethics/social sciences research (called ‘ethics study’ from here onwards) under consideration within this proposal is aligned directly to the DDD project; this additional work pertains to explore some of the ethical issues relating to the information gained from whole genome studies. REC approval has already been granted within the DDD project for contacting potential research participants to explain more about our ethics study and invite participation; we are now seeking additional REC approval to conduct the ethics study.
Appendices

All participants in the ethics study will be invited to complete an online questionnaire (and if they so choose, an interview) in their own time at home. They will not be participating on NHS premises; some of them will be recruited through the NHS (via an invitation to complete the online questionnaire at home) and REC approval has already been gathered for this initial invitation via the main DDD project. We have been advised by the sponsoring NHS R+D centre for the main DDD study that NHS Trust R+D approval is not necessary for the ethics study (letter attached) and therefore we will not be seeking this.

The aim of the DDD project is to identify new genetic causes for developmental disorders. However, in doing so, clinically significant ‘incidental findings’ may be uncovered. For example, a genetic predisposition to developing adult-onset breast cancer may be found in a two-year-old. Such a finding is unlikely to be related to the developmental disorder and yet could still be clinically significant to the child in later life as well as to other family members. Incidental findings could include variants of known and unknown significance, information about life-threatening and serious conditions and information about carrier status for a whole variety of genetic conditions. In the DDD research project, incidental findings will not be revealed to participants until more is known about the ethical implications of reporting such results. However, pressure is mounting from policy makers and ethicists to share clinically significant incidental findings, the thinking being that it is unethical to withhold genetic information that could enable the research participant to take preventative or therapeutic action to protect their health. Whilst there is often sympathy with this position, some genomic researchers are concerned that the time spent searching for, interpreting and reporting incidental findings unrelated to the research aims might jeopardise attaining those aims.

As yet there are no published large-scale studies that have gathered empirical data on any of these ethical issues; we aim to address this omission as part of this ethics study. We are ascertaining the views of research participants from the DDD study, genomic researchers, health professionals, laboratory staff and members of the public. The questionnaire will be freely available online and thus has the capacity to be viewed widely and also by people who have not received a direct invitation from us.

The study questions focus on attitudes towards sharing incidental findings, how such findings could be categorized, what to do with findings of unknown significance, attitudes towards mining specifically for certain types of incidental findings as well as views on how consenting procedures in whole genome studies should be structured. Our ethics/social sciences study uses a mixed methods approach, utilising both quantitative and qualitative techniques. Throughout 2011-2012 more than 25,000 people will be invited to participate in the online
questionnaire and from these 50-100 people will be invited for a face-to-face interview.

**The principal research question/objective**

- This is an exploratory study; the objectives are to investigate the following:
- Attitudes towards sharing of ‘pertinent findings’ from whole genome studies
- Attitudes towards sharing of ‘incidental findings’ from whole genome studies
- Attitudes towards receiving information relating to different categories of genetic condition
- Attitudes towards the sharing of raw genomic data
- Attitudes towards genomic researchers having a duty to search for incidental findings
- Attitudes towards having a ‘gatekeeper’ of genomic data
- Attitudes towards possible consenting procedures for genomic studies

**Scientific justification for the research**

Exploratory whole genome studies involve searching through all of an individual’s genes looking for variants in similarly affected people that could contribute towards causing a particular clinical phenotype (‘phenotype’ – is the set of clinical features a person might have, e.g. breast cancer). Whole genome studies, by virtue of involving all 20,000+ genes, inevitably produce large volumes of genetic data. Some of this may be directly linked to the phenotypes under study (considered ‘pertinent findings’) and others may be completely unrelated (considered ‘incidental findings’). There is no universally accepted definition of what an incidental finding is (Wolf, Lawrenz et al. 2008), and broadly speaking this could include variants of known and unknown clinical significance, variants linked to highly penetrant, serious, life-threatening conditions, non-paternity or ancestry data.

There is evidence to suggest that research participants in genetics studies want to receive pertinent findings relating to the medical condition under study (Wendler and Emanuel 2002). However, little is known about what research participants think about incidental findings, including clinically significant information relating to medical conditions unrelated to the medical condition under study. There is much discussion in the medical, ethics, genetics and social sciences literature about the merits and pitfalls of sharing genomic information in a research and clinical setting (Kohane, Masys et al. 2006; Renegar, Webster et al. 2006; Miller, Giacomini et al. 2008; Knoppers and Laberge 2009) and increasing support for the position that it is ethical to share incidental findings from whole genome studies (Knoppers, Joly et al. 2006; Wolf, Lawrenz et al. 2008; Beskow and Burke 2010; McGuire and Lupski 2010). ‘Even pure scientists can and should advance research
subjects well-being and respect their autonomy by making appropriate disclosures of potentially significant incidental findings’ (Miller, Mello et al. 2008).

Empirical data on the attitudes, values and beliefs of research participants in receiving genomic results is limited. There have been a few small-scale qualitative interview studies (Miller, Giacomini et al. 2008; Miller, Hayeems et al. 2010) and each has emphasised the need for further research in this area. To our knowledge there are no large-scale quantitative studies that clearly demonstrate attitudes towards sharing of incidental findings. Our ethics study proposes to address this.

**Appendices**

**Design and methodology**

**Online Questionnaire**

In preparation for obtaining REC approval, the study questionnaire design process has been started, this is so that the REC committee can see a copy of the preliminary questionnaire and thus will have full information about the subject matter covered. As with any questionnaire design process, extensive background work is required to create the questionnaire. A transparent summary of this work is included.

A nonstandard, quantitative questionnaire will be used in this study, including 24 closed questions. The questionnaire has been created using a systematic approach that adheres to robust principles of questionnaire design (Denscombe 2005; Aday 2006; Lietz 2010; Vicente and Reis 2010). See Appendix A for details of the questionnaire creation process, including piloting, face validity and reliability testing.

An informal systematic review of the literature has been completed. The databases PubMed and Scopus were used, with the search terms ‘genomic, incidental finding, research study, whole genome study, GWAS, ethics, results sharing, data sharing’. From this literature review, broad themes were drawn that formed the basis of the questionnaire. These themes addressed two needs: 1) they covered issues that other researchers had identified as important for further study 2) they covered issues that policy makers had anecdotally identified as important for practice, but for which there was no empirical data to support them.

The selected themes were checked for face validity with internal and external stakeholders in the research. As a result of these discussions a preliminary set of potential questions were created that related to each theme. These questions were debated and discussed in an informal focus group with 6 practicing genetic counsellors. Genetic counsellors were chosen because they are health professionals directly involved in recruitment into genetic and genomic research studies but also they work directly with members of the public. They also have a wealth of experience in genetics. Thus, this group were knowledgeable about
how complex issues surrounding genetics (i.e. ethical implications of genomic research studies) can be translated into lay language for the public – of key importance to the study questionnaire. The focus group offered feedback to the research team on whether the proposed questionnaire themes and types of questions appeared suitable and whether they were acceptable for gathering relevant and useful data.

The questionnaire structure has encompassed best, evidenced-based practice for questionnaire design. For example, questions are short (Fink 2003) and have less than 20 words per sentence (Oppenheim 1992), closed-end responses are listed vertically (Aday 2006) and demographic questions are positioned at the end (Lietz 2010). However, as our questionnaire is to be delivered online rather than via post, we have had to adhere to additional, evidence-based practice for online questionnaire design.

‘Although some of the design principles established for mail surveys may be translated to web surveys because both methods are self-administered, others require specific treatment in the Internet context because the technical features of the Internet allow a respondent-survey interaction that is distinct from that of paper questionnaires (Couper, Traugott et al. 2001)’ p252 (Vicente and Reis 2010)

Thus, we have included the use of video to deliver the information required to answer each question. This has the advantage over written text that would only be suitable to a postal questionnaire in that it is visually engaging, interesting and creative. Each mini-film that accompanies the questions will be deliberately short (less than one minute), so that it is not time-consuming to watch and will use a mixture of video footage, animation and voice-over to relay the intended messages (see later for details).

In accordance with ‘good’ practice for web-based questionnaire design, in-depth consideration has been given to the online style of the questionnaire (Vicente and Reis 2010). For example, there is evidence to suggest that participants in an online questionnaire make an initial assessment of how many questions there are and how long they perceive it will take them to complete them, if they can’t immediately make this assessment then they are not motivated to continue and may decline participation (Ganassali 2008). Thus our online questionnaire has been deliberately formatted so that it is easy to see how many sections there are to the questionnaire, and particular attention has been paid to making the navigation experience easy so that participants can easily see how much progress had been made as they are working through the questions (Vicente and Reis 2010). In addition to this there is evidence to suggest that there is less of a dropout rate and question omission rate if the questions are presented individually and the research participant has to actively click a button to reveal the next question as opposed to needing to scroll down the screen (Lozar Manfreda, Batagelj et al. 2002).
Appendices

Therefore, we have formatted our questions using multiple pages, so that participants don’t have to scroll down lots of text in order to answer the questionnaire. The longer the online questionnaire the higher the dropout rate (Ganassali 2008), thus our questionnaire has been designed to only take approximately 15 minutes to complete (considered ‘short’ in terms of online questionnaires). Online questionnaires that have a plain background have a lower dropout rate and higher completion rate than those with bright colours (e.g. purple and pink) (Dillman, Tortora et al. 1998), therefore we have chosen a plain dark background with light text – this configuration is thought to support best practice formatting for visually impaired research participants. The questionnaire has also been checked to ensure that it is appropriate for an International audience – UK-centric words such as ‘GP’ have been explained via a definition in the glossary and the socio-demographic data will contain variables that are applicable to any participant, irrespective of geography.

The questionnaire is being interrogated via 5 systematic pilot studies. Three of the pilot studies deliberately involve participants of varying ages, ethnic backgrounds and professional experiences; they will also involve representative people from the three target groups (lay members of the public, health professionals and genomic researchers). Between each pilot test further face validity testing will be done with internal and external stakeholders (nationally and internationally), including the involvement of a statistician, to check that the questions still make sense and appear to adequately measure the issues of interest. Two of the pilot studies will be conducted specifically to test the reliability of the questions. Participants in these studies will be from the three groups (lay public, health professionals and genomic researchers) and questionnaires will be completed at two different time points, 2 months apart. This is to check that the questions ascertain the same results over time (and thus are likely to be reliable measures).

From preliminary work done on the questionnaire validation process the following themes have been identified and will form the basis of the questionnaire content:

- Sharing of pertinent findings (should pertinent findings from whole genome studies be shared with research participants?)
- Sharing of incidental findings (should incidental findings from whole genome studies be shared with research participants?)
- Categorizing of incidental findings (what categories of incidental findings are research participants interested in knowing about?)
- What to do with raw genomic data (should raw genomic data be shared with research participants, what would they do with this?)
- Duty of genomic researchers (should genomic researchers actively mine for incidental findings or should they only consider them if they arise while they are searching for pertinent findings?)

GENOMETHICS

DDD/Ethics Project
Appendices

- Delivery of genomic information (should someone filter genomic results? If so, who?)
- Consent for genomic research (is it acceptable to have a ‘flexible consent’ process?)

Each of the above themes considers complex ideas of what a genome is and requires some level of understanding about genetics. Thus, particularly for the lay members of the public who will be participating in the project, there is great importance that these themes are carefully explained in lay language. As the questionnaire will be available online, video will be used to describe the required concepts in an engaging and interesting manner. Two independent film makers have been consulted and have assisted in the creation of 7 scripts that will be turned into video that will appear in each of the 7 themes in the questionnaire. As the creation of the film is expensive this will not be done until the questionnaire has gone through the REC approval process, this is just in case the REC committee wish to make changes to the questionnaire.

Semi-structured Interview
Participants who have completed the online questionnaire will be invited to participate in an interview, if they so choose. If they are interested they can leave their contact details and a member of the ethics research team will contact them to arrange a date to interview them at a place of their choice (e.g. their home or work). Interviews will be conducted in the UK only. From those who choose to leave their contact details, participants will be selected for interview depending on their responses to the questionnaire. The aim being to select as diverse a group as possible, including ‘deviant cases’, (Atkinson, Coffey et al. 2003) so that there is a real spread of views about the 7 themes above. Participants will also be from the three stakeholder groups: lay public, health professionals and genomic researchers.

Involvement of patients, users, members of the public:
Beverly Searle CEO of ‘Unique’ the support group for families and individuals affected by rare chromosome disorders is on the Scientific Advisory Board for the DDD project. She has been directly involved in the ethics questionnaire design process and members of Unique (parents of children with diagnosed and undiagnosed developmental disorders) have participated in the piloting of the ethics questionnaire. Thus, as patients and users of genome research studies (and also as members of the public) they have contributed directly to ensure the ethics questionnaire is appropriate and sensitive for members of the public.
Appendices

Principal inclusion criteria
We propose to include 3 broad groups of participants who will be recruited in the online questionnaire and interview study:
lay members of the public
health professionals
genomic researchers.

These broad groups can be further refined into:
Primary stakeholders (parents of children involved in DDD; genetic health professionals, including clinical lab staff; genomic researchers)

Secondary stakeholders (research participants in genomic studies (non-DDD) plus people totally unconnected to research and/or genetics; health professionals unconnected to genetics/DDD)

The principal inclusion criteria is that research participants fall into the above groups. Participants have to be over the age of 18. They can live anywhere in the World but to participate in the interview study they need to be available to meet in the UK. Anyone who understands written and spoken English can participate; the online questionnaire will be available with subtitles for hard of hearing users but will not be translated into other languages.

Principal exclusion criteria
The principal exclusion criteria is anyone who doesn’t have access to the Internet.

According to data from the 2011 census from the Office of National Statistics, 82.5% of the British population have access to the Internet and 60% (30.1 million) adults in the UK access the Internet every day or almost every day (www.statistics.gov.uk/cci/nugget.asp?id=8).

Internet use is directly linked to age; people aged 65 or older are least likely to use the Internet whereas 99% of 16-24 year olds regularly use the Internet. Participants in whole genome studies have a variety of ages, but anecdotally, the vast majority are under the age of 65. Thus, we feel that although using the Internet as the method for involvement in the ethics study will preclude some people from participating, it is likely that this group are the least interested in (nor appropriate for) whole genome studies anyway.

Sample size
20,000 research participants and health professionals involved in the DDD project will be made aware of the online questionnaire. 5,000 genetic health professionals and genomic researchers will be contacted through professional email list-serves. If we anticipate a 20% response rate as predicted for good quality online
questionnaires (Vicente and Reis 2010) then we predict our sample size to be approximately 5,000.

Of these, between 50-100 will be invited to have an interview. They will be selected on the basis of their answers to the online questionnaire as well as their willingness to be interviewed.

**How long do you expect each participant to be in the study in total?**
Participation in the online questionnaire takes 10 minutes. If participants volunteer to have an interview, this will last approximately one hour. Recruitment into the ethics study will last 2 years and the study as a whole lasts 5 years.

**What are the potential risks and burdens for research participants and how will you minimise them?**

**Online questionnaire**
The burden for research participant is taking the time to complete the online questionnaire. We have tried to minimise the inconvenience of this by making the questionnaire as visually interesting and as rewarding as possible, with the provision of video delivered in a creative and fun manner. We have also limited the questionnaire in size so that it should only take 10 minutes to complete and thus not be too arduous in terms of time. There are limited risks from completing the questionnaire – participation is anonymous (unless participants choose to leave their contact details because they would like to have an interview). For those participants who do leave their contact details these will be stored on a secure network and subject to Wellcome Trust Sanger Institute data protection policies.

Assessment of risk: low

**Interview**
Interviews will be conducted with people who volunteer themselves (i.e. they show an interest and are motivated); this recruitment mechanism was chosen so that it is the least burdensome for participants. The subject matter to be discussed in the interview is neither sensitive nor embarrassing; moreover, the interview will involve a discussion about sharing of data from whole genome studies and will expand on themes already introduced in the online questionnaire. The only burden associated with the interviews is the hour of participant’s time required to do the interview, plus the time taken to organise this.

Assessment of risk: low

The ethics study is being conducted independently of the DDD molecular study, thus neither questionnaires nor interview data will be linked directly to genomic data.
What is the potential benefit to research participants?
The potential benefit to research participants is a gain in knowledge about whole
genome studies and the opportunity to express their views about what should
count as good practice in this important area of research practice.

What are the potential risks for the researchers themselves?
The potential risks to the researchers are very low. The only risks relate to visiting
research participants in their own homes to conduct the interviews. The
researcher doing the interviews is experienced in home-visiting in both a clinical
and research context.

We will follow best practice for ‘Lone Workers Visiting Research Participants’, e.g.
as recommended by Faculty of Health Sciences at the University of Dublin and
Keele University. These recommendations suggest a researcher visiting a research
participant in their home should: carry an official identity card, carry a mobile
phone, maintain a visit proforma so that it is easy for colleagues to see exactly
where the researcher has gone, have car breakdown cover etc. Our Lone Worker
Recommendations are attached.

How will potential participants, records or sample be identified? Who will
carry this out and what resources will be used?
No NHS patient records are involved in the ethics study. There is also no link to
the molecular arm of the DDD project, thus participants in the ethics study are not
linked directly to any samples or information they may have provided separately to
the molecular DDD team or to their local health professional.

Participants completing the online questionnaire will be randomly assigned an
identifying number; this number will be used to identify their interview if they
choose to have one. The ethics researcher (Dr Anna Middleton) will hold the key
that links the identifying number to the research participant (and their personal
information if they chose to leave this). All participation is anonymous unless
participants choose to leave their contact details. They only need to do this if they
want to be involved in an interview or want to receive results of the study. It is
anticipated (based on previous studies of a similar nature) that approximately 20%
of participants completing the online questionnaire will leave their contact details.

Participants having an interview will have the choice of being video or audio-
taped. The recordings will be listened to by a member of the research team and
the words will be transcribed into written text. It is this written text that will
analysed for the research study. There will be no identifying information, such as a
name or address on this written transcript so for most people reading this text,
they will not be able to link this back to the person who gave the interview. Written
quotes from the transcript may be used in any reports or papers that are produced from the research, but again these will not contain any identifying information that relate to the research participant.

If the research participant chooses to be video-recorded then there are a number of options available to them in terms of how their interviews can be used. They could consent to just having an anonymous written transcript produced from the interview and nothing else. Or they could consent to clips from their video being used in the dissemination phase of the study. When the research is finished members of the research team will present this work at conferences and to a public audience, if they consent, then small clips from the research participant’s interview could be shared in such an arena, to demonstrate particular opinions. Thus the visual image from the research participant would be shared and their identity in this sense would be accessible (but not their name or address). The research participant could also consent to these clips being shown on the Internet. Research participants will be able to see their video first before they decide finally on any of these choices.

The consent form for the interviews will also ask the research participant to consider giving permission for other researchers in the future to analyse their interview. This could take the form of looking at the written transcript or watching the original video. Any future and different research projects would require additional ethical approval from a research ethics committee.

All video and audio data files will be stored electronically on the Wellcome Trust Sanger Institute secure network. All online questionnaires will be stored, with encrypted backup, served via https. Thus the computer storage of data is very secure.

**Will any participants be recruited by publicity through posters, leaflets, adverts or websites?**

The research team are currently displaying the following information on the www.ddduk.org website to describe the ethics study:
The above will form the basis of any publicity material that is advertised about the ethics study. However, it should be noted that as the questionnaire for the study is available freely on the Internet the researchers have no control how others choose to advertise the study (e.g. charities and support groups for people who take part in genomic research studies may choose to encourage their members to participate in the study and how they do this is up to them).

**How and by whom will potential participants first be approached?**

As participants in the study are recruited through an open access online questionnaire that is available to anyone to complete, it is likely that this will be propagated virally (i.e. people see the questionnaire, enjoy filling it in and tell their online friends about it). Thus the researchers have no control over how far and wide the questionnaire will be distributed, nor specifically, how the questionnaire will be advertised by others.
Parents invited to participate in the molecular studies involved in the DDD project will be given the details of the website for the online questionnaire. This initial contact, made by the genetic health professionals from each of the 23 regional clinical genetics services, has already received REC approval when the molecular DDD project was assessed (ref: 10/H0305/83). The genetic health professional will provide the details of the website together with the information they provide about the molecular studies. Parents can then choose if they wish to visit the website with the online questionnaire or not. They will not be chased up if they choose not to pursue this.

Genetic health professionals who are recruiting research participants in the molecular arm of the DDD project will be provided with the website address for the online questionnaire. This will be sent to them in an email and also will be available in their monthly newsletter. Genetic health professionals can then choose to complete the online questionnaire if they wish, in their own time at home.

Members of the charity Unique will be approached via the Unique Facebook page. Beverly Searle, CEO of Unique, the charity that supports parents and individuals with chromosome disorders is on the Scientific Advisory Body for the DDD project and is willing to support recruitment into the ethics study. Beverly will put up a notice on their Facebook page with a link to the ethics questionnaire.

Email list servers for genetic health professionals and genomic researchers will be used to advertise the link to the online questionnaire. For example, the Association of Genetic Nurses and Counsellors (UK) and National Society of Genetic Counsellors (US) and Wellcome Trust Sanger Institute and European Bioinformatics Institute will be targeted.

**Informed consent from or on behalf of research participants**
For completion of the online questionnaire consent is deemed implicit if research participants choose to fill it in. They are free to ignore it and thus decline participation.

For participation in the interviews informed consent will be obtained.

**Informed consent in writing?**
For participation in the interview section of the ethics study, participants will initially volunteer themselves for an interview by leaving their contact details at the end of the online questionnaire. They will then be contacted by a member of the research team and sent a copy of the Information Booklet and Consent Form (both attached), a provisional appointment will then be booked for the interview. Participants will be offered the choice of being audio or video-recorded and they...
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do not need to decide for definite until the day of the interview (the researcher will bring equipment for both). Participants will be given at least a week before the initial contact and the interview date and in this time they are expected to read the Information Booklet and Consent Form. When the researcher arrives to do the interview she will go through the Information Booklet and Consent Form in more detail and take written consent before the interview commences. If the research participant is happy to be video-recorded then they will be sent an electronic copy of the interview (after this has been completed) so they can view this. If on seeing their interview, they wish to change any of the video sections of the consent form then they can do this by letting the research team know within one month of the interview.

**How long will potential participants have to decide whether or not to take part?**
After the initial contact has been made and the Information Booklet and Consent Form have been sent, the research participant has at least a week to decide if they wish to proceed with the interview.

If research participants choose for their interview to be video-taped then they will receive a copy of this on CD/DVD to keep and they can check this to make sure they are happy with everything they said in the interview. A month after receiving this, if the research team haven’t heard from the research participant we will assume that the research participant is content for us to use this video in the ways they consented. If they wish to withdraw from the study they need to do this within one month of the interview, and can do this by contacting the ethics study team. Then all data will be destroyed, e.g. consent form, interview tape. After this time the anonymous written transcript will have been involved in an aggregate analysis and so it will not be possible for us to withdraw and destroy this.

If research participants consent to clips from their video being shared publically within presentations delivered as part of the dissemination phase but then later change your mind on this (e.g. after 1 month) then they need to let us know immediately. It may be possible from that point onwards to withdraw individual video clips from the dissemination.

**What arrangements have been made for persons who might not adequately understand verbal explanations or written information given in English, or who have special communication needs?**
The online questionnaire is in written English and the video is provided with a voice over and subtitles. The subtitles are particularly focussed at research participants who are hard of hearing; the online questionnaire has been written (and formatted) in such a way to enhance the readability for research participants who are visually impaired (dark background, light text, increased font size).
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Due to the extensive cost involved, as well as the difficulty in translating complex genetic language into other languages (and thus the need to bring in external experts in genetics and non-British languages) (Shaw and Ahmed 2004) we have decided to make no arrangements to translate the questionnaire into any other languages.

**What steps will be taken if a participant, who has given informed consent, loses capacity to consent during the study?**

If a research participant loses capacity after they have completed the online questionnaire then this questionnaire will still be included in the study. There is no mechanism in place to learn if a research participant has lost capacity and indeed the vast majority of the questionnaires will be anonymous.

If a research participant loses capacity after they have completed the interview, and the research team are informed of this, then the interview and any identifying information will be destroyed if requested by the research participant’s guardian.

**How will the confidentiality of personal data be ensured?**

The only personal data that will be stored are the names, email addresses and postal addresses of participants who volunteer to be interviewed. This information will be stored electronically, within encrypted backup, on the Wellcome Trust Sanger Institute computer network. The access to this is restricted and ring fenced so that it complies with Level 4 category data storage of the WTSI Human Genetics Data Security Policy (Feb 2011), attached.

In the interview phase of the study a written transcript of the interview will be stored, together with a randomly assigned code. The transcripts are what will be analysed by the research team and these will be anonymised, thus no identifying information will be contained within them.

The video data (if research participant’s consent to their interview being filmed) will be stored electronically on the same access-restricted, ring-fenced network as provided above, abiding by the WTSI Human Genetics Data Security Policy (Feb 2011).

**Who will have access to participants’ personal data during the study?**

The only people to have access to the participants’ name and address (that have been voluntarily supplied by the research participant) are the researcher(s) who will organise and complete the interview. These same researchers will also have access to the names and addresses of people who want to receive the study results. Once the interviews have been completed and the study results have been sent, then all names and addresses will be destroyed.
Storage and safeguarding data
All data will be stored according to intensively secure practices (for Level 4) as detailed in the WTSI Human Genetics Data Security Policy (February 2011) (policy attached). This policy is intended to protect highly personal genomic data but can also be applied to the questionnaire and interview data as well as the voluntarily submitted participant names and addresses collated in our ethics study. In order to comply with the Data Protection Act, the ethics study also has a nominated Data Controller who is registered with the Information Commissioner’s Office. In addition to this the ethics study will be registered with the HMDMC (Human Materials and Data Management Committee at the WTSI), this registration requires the demonstration of best practice to safeguard and store research and personal data and through this regular checks will be made to confirm this is happening in practice. The paperwork for the HMDMC will be completed in Autumn 2011 once the infrastructure for this has been created by the Policy writers at WTSI.

The signed consent form for the interview (containing research participants name and signature, but no other identifying information) will be collected by the interviewer at their visit. It will then be stored in a locked cabinet at the Wellcome Trust Sanger Institute. This will be kept for the duration of the research project and destroyed at the end of this. However, if the research participant consents to their interview data being involved in future research involving different researchers (who will also need to obtain Research Ethics Approval from an ethics committee for a different use of this data) then their consent form will be handed over with the interview data. This is so that the next researchers know that consent has been provided for them to access this data for use in future research.

If a research participant chooses to provide their contact information so that an interview can be arranged, e.g. address, telephone and email address, then this will be stored on the secure network (backup encrypted, ring-fenced, restricted-access) at the Wellcome Trust Sanger Institute. All of this personal information will be destroyed at the end of the research project and will not be shared with anyone outside of the research team. Even if consent is provided for the interview data to be involved in future research any personal contact details will not be forwarded on to the next research team (the only information they will see is a name and signature on the consent form).

If the research participant consents for their interview to be audio-taped then after this has been transcribed into written text the original audio-tape will be destroyed. If the research participant consents to be video-taped but only so that a written transcript can be created for analysis (and thus no video is used in the dissemination phase of the study), then the video-tape/file will be destroyed as soon as the written transcript has been created. The written transcript will be
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coded so that it is not possible to identify the research participant. Anything that the research participant chooses to say within the body of the interview, such as their address or name, will be deleted from the written transcript. Thus all written transcripts will be completely anonymous.

If the research participant chooses for their interview to be video-taped and also consents for clips from the video to be used in the dissemination phase of the project then, between working on it, this will be stored on a CD/DVD in a secure, locked filing cabinet at the Wellcome Trust Sanger Institute. We will also store this on the computer network at the Wellcome Trust Sanger network (backup encrypted, ring-fenced, restricted-access). It is worth mentioning that the computer network is fastidiously maintained and has very high levels of security against external hackers.

Will the research be registered on a public database?
The DDD project (including the ethics arm of this) will be registered on the NIHR Clinical Research Network Portfolio database.

How has the scientific quality of the research been assessed?
Independent external review
Review within the research team

The DDD research proposal, including the ethics study, was sent to several independent external reviewers appointed by the Health Innovation Challenge Fund administration.

What is the primary outcome measure for the study?
The primary outcome measures are to gather the following:
Attitudes towards sharing of pertinent findings from whole genome studies
Attitudes towards sharing of incidental findings from whole genome studies
Attitudes towards receiving information relating to different categories of genetic condition
Attitudes towards the sharing of raw genomic data
Attitudes towards genomic researchers having a duty to search for incidental findings
Attitudes towards having a ‘gatekeeper’ of genomic data
Attitudes towards possible consenting procedures for genomic studies

Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.
Descriptive statistics will be used to explore the quantitative questionnaire data, using cross-tabulations, chi squared analysis and logistic regression. A full time statistician will work on the data.

The semi-structured interviews will explore in more depth some of the issues introduced in the online questionnaire. The interviews will be transcribed into written text and analysed iteratively, thus analysis will begin before all the interviews have been completed (Coffey and Atkinson 1996; Atkinson, Coffey et al. 2003). Interviews will be conducted until there is a saturation of themes (Flick 2006). A constant comparative, thematic analysis will be applied (Silverman 2006), starting with an open coding procedure (Strauss and Corbin 1998) and then refining with axial coding (Flick 2006). Participants can provide open, free-text comments in some sections of the online questionnaire. These too will be subjected to a thematic analysis as above.

References


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Appendix B: Data Protection Registration

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<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>Name of WTSI Group Leader</td>
</tr>
<tr>
<td>2</td>
<td>Name of Data User(s) at the WTSI</td>
</tr>
<tr>
<td>3</td>
<td>Name of Data Collector(s) and their Institution (Note: This is the person who originally collected the personal data.)</td>
</tr>
<tr>
<td>4</td>
<td>Name of Data Controller, e.g., Genome Research Ltd.</td>
</tr>
<tr>
<td>5</td>
<td>Name of Sanger institute project(s) in which the data is/are to be used. If applicable, please ensure that the project title clearly relates to the study title entered in Sequencescope (the WTSI DNA pipelines tracking system).</td>
</tr>
<tr>
<td>6</td>
<td>Brief description of the project(s) in which the personal data are to be used.</td>
</tr>
</tbody>
</table>
published large-scale studies that have gathered empirical data on views about sharing incidental findings from whole genome studies, we aim to address this.

Our objective is to ascertain the views of research participants from the DDD project, genomic researchers, genetic health professionals, laboratory staff and members of the public. Our questions focus on attitudes towards sharing incidental findings, how such findings could be categorized, what to do with findings of unknown significance, attitudes towards mining specifically for certain types of incidental findings as well as views on consenting procedures. Quantitative and qualitative research methods are used to explore the above issues.

<table>
<thead>
<tr>
<th>7</th>
<th>Name(s) of Research Ethics Committee(s) (REC) approving project</th>
<th>Cambridge South</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Date(s) of REC approval(s)</td>
<td>26th August 2011</td>
</tr>
<tr>
<td>9</td>
<td>REC approval reference number(s) and, where relevant, HMDMC approval number(s)</td>
<td>11/EE/0313</td>
</tr>
<tr>
<td>10</td>
<td>Who are the Data Subjects, e.g., patients, families of patients, controls, employees, healthy volunteers, clinicians?</td>
<td>Healthy volunteers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. lay members of the public (including parents involved in the molecular arm of the DDD project)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. genetic health professionals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. genomic researchers</td>
</tr>
<tr>
<td>11</td>
<td>Are the Data Subjects adults, children, or adults lacking capacity?</td>
<td>Adults (no children and no adults lacking capacity)</td>
</tr>
<tr>
<td>12</td>
<td>Where will the data be stored, e.g., encrypted laptop, non-networked UNIX file system? Please refer to the Human Genetics Data Security Policy for further information (<a href="https://helix.wtac.org/services/human-genetics-data-security-policy">https://helix.wtac.org/services/human-genetics-data-security-policy</a>)</td>
<td>All personally identifiable data (such as postcode, email address, name and address, when provided) will be stored at Level 4 according to the WTSC Human Genetics Data Security Policy, i.e. data will be stored on a restricted access, ring-fenced, backup encrypted network. All other research data (anonymous questionnaire answers and video interview data) will be classed as and stored at Level 3. The video interview data will not contain any personally identifiable information (e.g. name/address etc) other than the visual image of the participant. David Davison and Tim Hubbard have agreed</td>
</tr>
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</table>
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**WTSI HMDMC Data Protection Register Number**

For Office Use Only

DP11/001 (Update 2)

| Question                                      | Response                                                                
|------------------------------------------------|--------------------------------------------------------------------------|
| 13 How will the data be stored, e.g., electronic database, videos, avi files, paper files? | This is a social sciences study. The 'data' are attitudinal answers to an online questionnaire and interview. The data takes the form of written transcripts, audio/video (avi) files and hard copies of written consent forms. None of the data contains sensitive, personal or embarrassing information (including no data in the list provided at the end of this form). However, if they so choose, research participants can leave their email address if they would like to receive aggregate research results or their name and postal address if they would like to be interviewed. It is this latter information that is considered ‘personal’ and subject to rigorous protection issues. Research participants are being asked to volunteer their views about sharing incidental findings from whole genome studies. No biological or phenotypic data is being gathered. Electronic data will be stored, with restricted access, it is also ring-fenced and has encrypted backup. The vast majority of online questionnaires will have been completed anonymously. If participants choose, they can leave their contact details so that they can receive study results or so that they can volunteer to be interviewed. It is this personally identifiable information that requires the upmost electronic protection. This personal data will only be stored for a finite period of time. Once the study results have been emailed or an interview has been arranged and completed then at that point the contact details will be deleted. There will be no paper storage of this data. If participants volunteer to be interviewed then they will be recorded (audio or video – their preference). If they choose an audio recording then this will be destroyed after this has been listened to and a written transcript has been created from this. The written
transcripts will contain no identifiable information and thus will be anonymous. These will be stored electronically. If participants choose to be video-recorded they can consent to various uses of this. If they select for their video (and thus a visual image of themselves that reveals their identity) to be used in the dissemination phase of the study then small clips from their video will be aired publicly. They can also consent to these being used on the Internet. Whilst the video is being worked on it will be stored electronically at Level 3. There will be no hard copies of the video.

With regards to the video recording; the filming will take place on a digital camera where footage is saved as an avi file (i.e., no tapes or discs used). The avi file will then be downloaded and electronically stored according to the Level 3 Data Security Policy. There will be no names and addresses attached to the file (so no personal data in that sense) but obviously there will be a visual image of the research participant and they will have consented to this being looked at and stored.

If volunteers choose to be interviewed then they will sign a paper consent form to indicate what they consent to in terms of use of their data. These signed consent forms will be kept in a locked filing cabinet at WTSI.

All level 3 data (anonymous questionnaire data and video interview files) will be worked on from an encrypted, password protected computer as well as a portable device such as a laptop (also password protected and encrypted). There is a necessity to be able to work on the data on a portable machine because the researcher will be required to travel around the UK to collect the interviews, but also travel around the world presenting the project findings (including video clips) in the dissemination phase of the project. Between travelling it will be necessary to store the portable device at the researcher’s home and this will be done in a locked.
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**DDD/Ethics Project**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>14 What security checks do you have in place, e.g., encryption, locked filing cabinet, password protection?</td>
<td>Backup encryption of electronic files, password protected, locked filing cabinet.</td>
</tr>
<tr>
<td>15 How long will the project last?</td>
<td>2010-2015.</td>
</tr>
<tr>
<td></td>
<td>Analysis of the data may continue for up to 15 years past the official end of the project. This analysis will involve the anonymous written transcripts from the interviews, the anonymous completed questionnaires and (if the research participant consented to this) the video files.</td>
</tr>
<tr>
<td>16 How long will the personal data be stored for?</td>
<td>The vast majority of personal data will have been destroyed before the end of the project (i.e. if a name and address was provided so that an interview could be completed then after the interview has been conducted the name and address will be destroyed). However, there may well be small numbers of personal data that is stored right up to the end of the project (i.e. to 2015 when the project finishes). After this date all the provided personal data (names, addresses, email addresses) will be destroyed. If research participants consented to their data being used in future social sciences...</td>
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*DP11/001 (Update 2)*
<table>
<thead>
<tr>
<th>Q</th>
<th>Description</th>
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<tbody>
<tr>
<td>17</td>
<td>How will all the types of identifiable data collected (e.g., electronic, video, paper) be destroyed?</td>
</tr>
<tr>
<td></td>
<td>The paper copies of the consent form will be shredded in 2015 unless the research participant gave specific consent to use their questionnaire and interview data in future social sciences research. In this case, the paper copies will be stored in a locked filing cabinet and then handed over to the next researchers. Electronic data (including avi files) will be destroyed as per the guidelines for Level 3 data. All level 4 data will be destroyed as per the guidelines for level 4 data.</td>
</tr>
<tr>
<td>18</td>
<td>What personal identifiers will you be using and why are these required?</td>
</tr>
<tr>
<td></td>
<td>Research participants can volunteer to provide their email address if they wish to receive details of the study results. They can also volunteer to have an interview, in which case they will choose to provide their name and address. We will be able to link a name and address to the responses given in the research questionnaire and to the Interview; although once the interview is done, there is no need to store the name and address anywhere (indeed it will not appear on the written transcript created from the interview)</td>
</tr>
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</table>
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and thus can be destroyed.

The questionnaire itself does contain some sensitive data as it includes questions relating to demographic data, including ethnicity.

The questionnaire itself contains no embarrassing or sensitive data (it asks for attitudes towards the sharing of genomic information for example and the research participant has filled it in willingly (i.e. they chose the answers that they gave), there is no predicted adverse outcome from there being a link between the research data and the identifiable information — this is quite a different scenario to molecular genetic data being linked to identifiable information.

The personally identifiable information from the questionnaire will be separated out from the rest of the questionnaire responses and stored at Level 4. The rest of the questionnaire responses will be stored and managed at Level 3. The link between the personally identifiable data and the anonymous data will be stored at Level 4.

19. If storing personal identifiers alongside research data, please describe how personal identifiers, although linked to the data, will be anonymised. If the research data cannot be anonymised during the research process, please give reasons for this.

The online questionnaire data will go straight into an aggregate pool for analysis. It will not be possible, nor necessary, to identify individuals from this. Even though the original questionnaire that was completed may have contained a voluntarily provided email address at the end, this data will not be pooled into the aggregate file and will be stored separately as above. Thus all the questionnaire data will be completely anonymous.

When the interviews are completed the audio/video file will be listened to and an anonymous written transcript will be created. Even if the research participant themselves provided some information in their interview that could be used to identify them, this will be deleted from the written transcript. The written transcript will be given a code and the transcript will be used in the analysis. Only the researcher (Anna Middleton) will have access to the key that links the identifiable information and the transcript. However,
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**Please describe the type of personal data you will be using, e.g., personal details, physical description, personality, family circumstances, social circumstances, education, physical health, mental health.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
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<tbody>
<tr>
<td>20</td>
<td>Email address Name Postal address</td>
</tr>
<tr>
<td></td>
<td>Based on similar research of a similar size and scale done by the authors when based at Cardiff University (prior to working at WTSI) it is anticipated that there may be approximately 500 individuals who volunteer their email address, name and postal address. No individual research results will be shared with anyone directly associated with the data subject.</td>
</tr>
<tr>
<td>21</td>
<td>If the results of the research will be shared with individuals or organisations directly associated with the Data Subject, please explain what data will be shared and with whom, e.g., the Data Subjects themselves, family, guardians, clinicians, legal representatives, social workers.</td>
</tr>
<tr>
<td>22</td>
<td>If the results of the research will be shared with individuals or organisations directly associated with the Data User, please explain what data will be shared and with whom, e.g., research sponsors, ethics committees, funding agencies, collaborators.</td>
</tr>
<tr>
<td>23</td>
<td>If the results of the research will be shared with other individuals or organisations, please explain what data will be shared and with whom, e.g., Dept. of Health, health authorities, social services, central government, family</td>
</tr>
</tbody>
</table>

once the interview has been completed there is no need to keep the names and addresses anymore and these will be deleted/destroyed.

If the interview is audio-recorded the audio file will be destroyed after the written transcript has been created. If the interview is video-recorded and the research participant has not given consent for their video to be used in the dissemination phase of the project then once the written transcript has been created the video file will be destroyed. If they have given written consent for their video file to be used in the dissemination phase of the project or indeed in future research projects (that would require new REC approval) then these will be stored as above. No other identifiable information will be stored with the video files, such as name and address.
<table>
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<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>Will the results of your research be published in an academic journal or other publication? Yes / No (Note: If you do publish the results of your research, they must not contain data by which an individual can be identified.)</td>
<td>Yes</td>
</tr>
<tr>
<td>All written publications will contain no identifiable information from research participants. All spoken conference presentations may contain video clips from the interviews (if the research participant consented to this).</td>
<td></td>
</tr>
<tr>
<td>Do you intend to transfer personal data to a country or territory outside the European Economic Area (EEA)? Yes / No (Note: If you do intend to transfer personal data outside the EEA, please give details and attach a copy of your agreement with the recipient)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Notes**

*The WTSI Human Genetics Data Security Policy can be found at: [https://helix.wtac.org/services/human-genetics-data-security-policy](https://helix.wtac.org/services/human-genetics-data-security-policy)*

**Further examples of personal data:**

<table>
<thead>
<tr>
<th>Personal characteristics</th>
<th>Personal details, physical description, habits, personality, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and other classes</td>
<td>Physical health record, mental health record, disabilities and infirmities, dietary and other special health requirements, sexual life details, racial/ethnic origin, and other convictions, criminal intelligence, political opinions, political party membership, support for pressure groups, religious or other beliefs.</td>
</tr>
<tr>
<td>Family circumstances</td>
<td>Current marriage or partnership, marital history, details of other family or household members, other social contacts.</td>
</tr>
<tr>
<td>Social circumstances</td>
<td>Accommodation or housing, immigration status, leisure activities, interests, membership of voluntary, charitable bodies, licences or permits held, court / tribunal / inquiry proceedings, property, professions, travel details, lifestyle, public office held, complaint / incident / accident details.</td>
</tr>
<tr>
<td>Education, Skills, profession</td>
<td>Academic record, qualification and skills, professional expertise, publications, student.</td>
</tr>
</tbody>
</table>
Appendices

Appendix C: Lone Worker Policy

Health & Safety Code of Practice

Home Visiting as Part of the DDD Project
Appendices

Scope
Anyone involved in, or managing those undertaking home visits as part of the DDD project.

Definitions

Lone workers  Those who work by themselves without close or direct supervision.

Visitor  Member of WTSI staff who as part of their job role visit homes and premises of persons involved in research

Home visiting  Any visit to a third parties home or premises to carry out work relating to the DDD project. I.e. not the visiting persons’ home address or usual place of work.

Objectives
To ensure that all persons engaged in home visits as part of the DDD project are not exposed to danger in accordance with the relevant legislation and guidance in this code of practice. This document assists in the identification of potential hazards and gives the basic safety precautions that must be adopted.

Arrangements
Members of the Board of Management are responsible for ensuring the implementation of this guidance in the areas under their control. Simply issuing this guidance to the concerned parties does not constitute implementation. Compliance should be achieved through the dissemination of information and the provision of appropriate training to all relevant persons.

They shall ensure that:
- That all users understand the hazards involved in home visiting;
- The necessary equipment and personal protective equipment (PPE) is provided;
- There are written emergency protocols;

GENOMETHICS

DDD/Ethics Project
The Campus Health and Safety Service is notified of any incidents; Sufficient resources are allocated to cover the above items.

**Supervisors/Principal Investigators shall ensure that:**
- A suitable and sufficient risk assessment is conducted; and a suitable procedure is produced.
- There is adequate training and, where necessary, supervision;
- Where training has taken place records are maintained for each individual.

**Individual users shall ensure that:**
- They take reasonable care of themselves and others affected by their actions;
- Local area procedures are complied with;
- That they do not endanger themselves or other by use of incorrect/unsafe practices.
- They carry a personal alarm (to be kept in an accessible place).

- Every member of staff who travels away from the WTSI must complete a visit proforma (Appendix) as well as their personal diary as a means of logging visits. The visit proforma must be made easily available to colleagues who are monitoring your visit.

- Do not carry large amounts of money or valuables.

- New staff should have familiarisation sessions on home visits with an experienced member of staff during their induction period and only complete a home visit on their own when they, and their more experienced colleague, agree that they are ready. A formal risk assessment should be undertaken prior to new staff undertaking lone working.

- Obtain information about where you are visiting before the visit. Ask how many people will be at the visit.

- Risk assessment - ensure that there is opportunity to feedback relevant information from a lone visit - e.g. if you felt at risk or if there was an incident. This should be formally recorded and reviewed with your Manager/Supervisor and other members of your team to ensure appropriate follow up action is taken and to minimise any risk in subsequent visits.
Appendices

Pre - Visit

- Visiting staff must carry a formal means of identification.

- Ensure that the Visitor has detailed travel route instructions to their destination.

- Ensure that the Visitor has an effective means of communicating with their place of work or home.

- Make and keep pre-arranged appointments, and notify the participant if you cannot keep them.

- Arrange home visits during daylight hours whenever possible.

- When visiting the home of a participant, you should complete a visit proforma and leave the details with a nominated colleague or the Wellcome Trust Genome Campus Security Reception.

- Ensure that the nominated colleague or WTGC Security Reception are aware of the details of your visit and have agreed to monitor during the visit and when the visit is completed.

- Ensure that those persons nominated are available on the phone and contactable by you for the duration of your visit.

- Contact your nominated colleague if you are late for your appointment and ask them to note this on the visit proforma.

- Prepare yourself for difficult meetings by finding out everything you need to know before arriving and planning in your mind how you are going to deal with the situation.

- **Think carefully about the following procedures for ensuring your safety during home visits.** Use your professional and personal judgement to decide whether they are appropriate to any given situation. If in doubt, adhere to the following guidelines:
During Visit

- **Do not** enter someone’s home, if you don’t feel comfortable or safe.

- **Do not** enter a house if the person you have arranged to see is not there. Be aware of, and maintain, personal safety at all times during visits.

- Always explain your research role clearly and the conditions of confidentiality.

- Your safety is the primary concern, which should be placed above completion of research tasks.

- Leave your mobile telephone switched on during the interview.

On Completion of a Visit

- The Visitor must contact their nominated colleague or the Wellcome Trust Genome Campus Security Reception as soon as they have completed the home visit. This time will be noted on the visit proforma.

- If the Visitor decides that they are not going to return to the office after their last visit, they should ensure that the appropriate person in the office knows about that by telephoning in. The visit pro-forma can then be completed accordingly.

- The researcher should contact a colleague at the office if an additional home visit is to be made and give all the relevant details which will be recorded on a new visit proforma. N.B. if this colleague is different from the nominated colleague from visit 1, then the researcher must ensure visit 1 nominated colleague is informed.

- It is the responsibility of the nominated colleague to ensure s/he is available to receive a call and monitor the time when the visit should be over. If circumstances change, s/he should arrange for another colleague to monitor the visit.

- If the interview is still in progress as the deadline for contacting the department approaches, the researcher should excuse him/herself and call their nominated colleague to inform them.
Appendices

- If the deadline passes and the researcher has not contacted the nominated colleague, the nominated colleague should ring the mobile telephone number of the researcher. If there is no answer, the nominated colleague should inform the Genome Campus Security immediately and ensure the police are informed immediately.

Home Visit Good Practice

- If you feel at all uneasy about conducting a home visit on your own, ask a colleague to accompany you.

- If you are late arriving for your appointment, let your nominated colleague/Genome Campus Security Reception know and record the revised time on the visit proforma.

- When visiting people’s home, try to let the tenant lead the way. Avoid being the first to go into any room. Be extra careful when alone with participants e.g. fetching something from a handbag, comforting participants. You should always make sure that the exit from the room is clear.

- Animals in the home: if you are in any doubt about the behaviour of animals in the home, ask for it/them to be locked away while you are visiting.

- Never undertake an interview or assessment in the bedroom.

- Do not give your personal telephone number or address.

- You should not interview anyone who is under the influence of alcohol or drugs.

- If you feel uncomfortable while in a person’s home, you should take steps to leave immediately.

- A professional and friendly attitude should be adopted but over familiarity must be avoided.

- Remember that the interviewee may also feel anxious about the interview and your visit. You should bear this in mind whilst also ensuring your own safety.

- Be alert for signs of DANGER
Appendices

- Raised voice, rapid speech and babbling indicates rising tension.

- Changes in tone and pitch as the conversation progresses may suggest anger, frustration or impending violent behaviour.

- Keep your distance. Each of us has a personal space, which we defend when we feel it is being invaded.

- Be alert for body language that may indicate developing anger - e.g. flushed face, fidgeting, pointing, folded arms.

- Awkward or potentially threatening situations

- If an awkward or potentially threatening situation arises, this should be reported to a colleague as soon as possible. The facts should also be recorded in a specific "untoward incident" file.

- Formal arrangements should be in place for staff to be accompanied by a colleague for subsequent visits if there have been any incidents giving cause for concern on the first occasion.

- If, for any reason, you are concerned for your personal safety once you arrive at your appointment venue, then do feel able to cancel your appointment. On return to the office, make alternative arrangements when another member of staff experienced in working on their own undertaking home visits can accompany you.
# Home Visit Proforma

<table>
<thead>
<tr>
<th>Example Data</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name of person conducting visit off campus</th>
<th>Dr Anna Middleton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile number of person conducting visit</td>
<td>0788 190 3069</td>
</tr>
<tr>
<td>Car Registration, make, model, colour</td>
<td>KT05 KFJ</td>
</tr>
<tr>
<td></td>
<td>Mercedes, B-Class, grey</td>
</tr>
<tr>
<td>Name of person monitoring visit</td>
<td>Dr Caroline Wright (if before 5pm) or Alastair Gadney (husband) (if after 5pm)</td>
</tr>
<tr>
<td>Date of visit</td>
<td>Monday 6th June 2011</td>
</tr>
<tr>
<td>Time of visit</td>
<td>2pm</td>
</tr>
<tr>
<td>Duration of visit</td>
<td>1 hour</td>
</tr>
<tr>
<td>Address of visit</td>
<td>3 Bulstrode Gdns</td>
</tr>
<tr>
<td></td>
<td>Cambridge</td>
</tr>
<tr>
<td></td>
<td>CB3 0EN</td>
</tr>
<tr>
<td>Gender of research participant</td>
<td>Male</td>
</tr>
<tr>
<td>Number of participants</td>
<td>1</td>
</tr>
<tr>
<td>Expected route</td>
<td>Google maps directions: CB10 1SA to CB3 0EN</td>
</tr>
<tr>
<td>Notes</td>
<td>Person monitoring the visit should write additional information as necessary here (e.g. if the researcher calls to say they are late etc.)</td>
</tr>
</tbody>
</table>
Appendices

Appendix D: Favourable REC Opinion

25 August 2011

Dr Anna Middleton
Ethics Researcher
Wellcome Trust Sanger Institute
Genome Campus
Hinxton
Cambridge
CB10 1SA

Dear Dr Middleton

Study title: Exploring the ethical implications of whole genome studies
REC reference: 11/EE/0313

Thank you for your letter of 23 August 2011 responding to the Proportionate Review Sub-Committee’s request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the sub-committee.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS HSC R&D office prior to the start of the study (see “Conditions of the favourable opinion” below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.research.nhs.uk.

This Research Ethics Committee is an advisory committee to the East of England Strategic Health Authority. The National Research Ethics Service (NRES) represents the NRES Directorate within the National Patient Safety Agency and Research Ethics Committees in England.
Appendices

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation.

Approved documents

The documents reviewed and approved by the Committee are:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertisement</td>
<td>version 1</td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Evidence of Insurance or indemnity</td>
<td>insurance details</td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Interview Schedules/Topic Guides</td>
<td>version 1</td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Investigator CV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: WTSI: Data Security Policy</td>
<td></td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Other: Lone Working Guidance for Staff</td>
<td></td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Other: Letter from NHS R &amp; D - no approval required</td>
<td></td>
<td>25 July 2011</td>
</tr>
<tr>
<td>Participant Consent Form</td>
<td>version 2</td>
<td>23 August 2011</td>
</tr>
<tr>
<td>Participant Information Sheet: information booklet</td>
<td>version 2</td>
<td>23 August 2011</td>
</tr>
<tr>
<td>Protocol</td>
<td>version 1</td>
<td>21 July 2011</td>
</tr>
<tr>
<td>Questionnaire: Online Questionnaire</td>
<td>version 1</td>
<td>25 July 2011</td>
</tr>
<tr>
<td>REC application</td>
<td>78769/23434 2/1275</td>
<td></td>
</tr>
<tr>
<td>Response to Request for Further Information</td>
<td>from Anna Middleton</td>
<td>23 August 2011</td>
</tr>
<tr>
<td>Summary/Synopsis</td>
<td>Appendix A: Flow diagram of questionnaire design - version 1</td>
<td>25 July 2011</td>
</tr>
</tbody>
</table>

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

This Research Ethics Committee is an advisory committee to East of England Strategic Health Authority
The National Research Ethics Service (NRES) represents the NRES Directorate within
the National Patient Safety Agency and Research Ethics Committees in England
Appendices

Reporting requirements

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

11/EE/0313 Please quote this number on all correspondence

With the Committee’s best wishes for the success of this project

Yours sincerely

Dr Leslie Gelling
Chair

Email: leanne.moden@eoe.nns.uk

Enclosures: After ethical review – guidance for researchers

Copy to:
Dr David Davison
Wellcome Trust Sanger Institute
Hinxton
Cambridge
CB10 1SA

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Appendix E: Creation of a Bespoke Survey

Informal systematic review of the literature (inc. genomic research, ethics, social science, policy, public health and clinical genetics literature).

led to: creation of themes to include in questionnaire

FACE VALIDITY CHECK
Discussion of questionnaire themes with internal stakeholders:
- Ethicist (Mike Parker); Genetic Health Professional (Helen Firth); Genomic Researchers (Nigel Carter, Matt Hurles, Caroline Wright)

led to: creation of first draft of questionnaire

FACE VALIDITY CHECK
Discussion of questionnaire themes with external stakeholders:
- Lay representative (Beverley Searle); Statistics (Kate Morley, Wellcome (Beth Thompson and Anna Wade)

led to: QUESTIONNAIRE DRAFT 2

FOCUS GROUP
6 genetic counsellors from Addenbrookes Hospital
Checked proposed questionnaire themes for face validity, gathered feedback on initial questions and how appropriate these might be for research participants and patients

led to: QUESTIONNAIRE DRAFT 3

Ensured questionnaire is appropriate for:
Primary stakeholders (lay members of the public: parents of children involved in DDD; Genetic health professionals, including clinical lab staff; Genomic researchers)

Secondary stakeholders (lay members of the public: research participants in genomic studies (nonDDD) plus people totally unconnected to research and/or genetics; Health professionals unconnected to DDD)

led to: QUESTIONNAIRE DRAFT 4

Discussion with film makers about the introductory films that accompany each question. Particular care given to use of lay language and accurate translation of genetics terminology

led to: QUESTIONNAIRE DRAFT 13

READABILITY TESTING
Checked the use of Plain English with particular attention given to sentence construction and ease of reading for people whose first language is not written English. Performed readability scoring (Flesch-Kincaid and Flesch)

led to: QUESTIONNAIRE DRAFT 12

FACE VALIDITY CHECK
Discussion with STATISTICIAN about question structure and content in terms of statistics, reliability testing and recruitment

Discussion with external researchers conducting similar research (Prof Anneke Lucassen, Gill Crawford, Univ Southampton)

led to: QUESTIONNAIRE DRAFT 11

FACE VALIDITY CHECK
Discussion with internal stakeholders about revised questionnaire after first pilot
- Ethicist, Genetic Health Professional, Genomic Researchers

led to: QUESTIONNAIRE DRAFT 10

PILOT STUDY 1
Observed 5 people as they completed the questionnaire: discussed question themes, question structure, order of themes, order of questions, question wording. Obtained direct, live feedback on the experience of filling in the questionnaire

led to: QUESTIONNAIRE DRAFTS 5-9

GENOMETHICS
DDD/Ethics Project
Genetic health professionals, including clinical secondary stakeholders (lay members of the public), led to creation of Rirst draft of questionnaire.

Checked proposed questionnaire themes for (inc genomic research, ethics, social science, questions and how appropriate these might be for research participants and patients; policy, public health and clinical genetics).

Informal systematic review of the literature led to: QUESTIONNAIRE DRAFT 1.

Primary stakeholders (lay members of the public unconnected to research and/or genetics); 6 genetic counsellors from Addenbrookes face validity; gathered feedback on initial questionnaire. Ensured questionnaire is appropriate for:

Discussion of questionnaire themes with research participants and patients.

Observed 5 people as they completed the questionnaire: discussed question themes, question structure and content in terms of delivery of questionnaire to 2 genomic researchers and 3 members of the public. This time questionnaire completion was unaccompanied and timed. Feedback was gathered on ease of completion and understanding of questions.

led to: QUESTIONNAIRE DRAFT 14

RELIABILITY TESTING 1A
PILOT STUDY 3
Questionnaires completed by 39 representatives of primary and secondary stakeholders:
(13 Genomic Researchers; 9 members of the public; 9 NHS clinical lab staff; 8 genetic health professionals)
Timings taken

led to: QUESTIONNAIRE DRAFT 15

Created of online questionnaire. Changed formatting to ease readability and flow of questions for an online audience (Vicente and Reis, 2010)

led to: QUESTIONNAIRE DRAFT 16

RELIABILITY TESTING 1B
PILOT STUDY 4
Questionnaires completed by same 39 representatives of primary and secondary stakeholders as in Pilot Study 3. Pilot Study 4 completed 2 months after Pilot Study 3. To check for reliability of questions

led to: QUESTIONNAIRE DRAFT 17

PILOT STUDY 5
Questionnaires completed by the following groups:
- Lay members of the public (recruited through Unique, charity for parents of children with genetic disorders, inc people who have taken part in genomic studies; Lay members of the public who are aged under 25 and aged over 60 (to check for age sensitivity); Health professionals unconnected to genomic research.

led to: QUESTIONNAIRE DRAFT 18

FINAL QUESTIONNAIRE ROLLED OUT

CODING OF QUESTIONNAIRE IN STATA
Creation of coding frame for questionnaire analysis

led to: QUESTIONNAIRE DRAFT 19

FINAL FACE VALIDITY CHECK
Questionnaire shared with international researchers from outside project team (Prof Sylvia Metcalf, Australia and Prof Lynn Dressler, USA, experts in gathering empirical data about genomic research)
Anna Middleton
@Genomethics

Genomethics promotes discussion about the ethics of current genome research and its impact on real people

Cambridge, UK · genomethics.org