“GenomEthics”
Prof Anna Middleton
Head of Society and Ethics Research Group
We must bridge the gap between technology and policymaking. Our future depends on it

Integration of social science into research is crucial

Social scientists must be allowed a full, collaborative role if researchers are to understand and engage with issues that concern the public, says Ana Viseu.
Overview

• Principles of Bioethics

• Current ethical issues
  • What to do with incidental findings from research?
  • Genomic data sharing – privacy and concerns
  • Embryo editing
  • ABC versus St Georges NHS trust

• Policy and governance creation
Principles of Bioethics

- Autonomy (individual choice)
- Non-maleficence (do no harm)
- Beneficence (do good)
- Justice (apply equitably)

- Beauchamp and Childress from 1982 -
Examples

- What to do with incidental findings from research? (autonomy, justice)
- Genomic data sharing – privacy and concerns (non-maleficence)
- Embryo editing (beneficence versus non-maleficence)
- ABC versus St Georges NHS Trust (whose autonomy?)
ABC Versus St George’s NHS trust
Huntington's disease: Woman who inherited gene sues NHS

Fergus Walsh
Medical correspondent
@BBCFergusWalsh

18 November 2019
ABC vs St Georges

• 2009 genetic testing confirmed that the patient had HD.

• Insisted he did not want his daughters, one of whom was pregnant, to be informed about HD status

• Daughter accidentally informed of HD diagnosis after birth of her son

• Daughter tested and found to carry HD gene, decided to take legal action against medical team who chose not to disclose diagnosis

https://www.bbc.co.uk/programmes/b07nrxd4
Should health professionals have a legal duty to share genetic information with a patient's relatives?

- Yes, but only if there is agreement from an affected relative
- Yes, even if there is no agreement from an affected relative
- No
- I don't know
Disclosing genetic and other shared information

• In the UK, confidentiality is not absolute
• Disclosure can occur if
  • the patient refuses to inform others,
  • an identifiable person (relative) is at serious risk of harm
  • such harm might be prevented by disclosure. (GMC)
• In ABC, Court of Appeal ruled doctors may have legal duty of care to inform relatives of risk
• Clinicians need to weigh the potential harms of disclosure against the potential benefits
Embryo editing
“It would be irresponsible to proceed with any clinical use of germline editing unless and until
• (i) the relevant safety and efficacy issues have been resolved ... and
• (ii) there is broad societal consensus” about the appropriateness of the proposed application
Next steps

• How to ensure the effectiveness of international ethical and scientific positions?
• What to do in cases of violation of these norms (on the part of scientists, publishers, funders, governments)?
• Balancing concerns and hopes of different publics – what counts as ‘societal consensus’
What to do with incidental findings from research?
Questions about you

Sharing of Pertinent Findings

- Sharing of Incidental Findings
- Categorizing Incidental Findings
- Relations with Risk
- Raw data
- Duty of Genomic Researchers
- Filter of Genomic Information
- Consent for genomic research
- Last few questions about you

Sharing of Pertinent Findings

- Should Pertinent Findings from genome studies be made available to research participants?
  - Research participants should be able to receive pertinent findings if they want them
  - I don't think pertinent findings from research projects should be available
  - I don't know
‘INCIDENTAL FINDING’, OPPORTUNISTIC SCREEN

e.g. BRCA1

PERTINENT FINDING
Developmental Disorder
gene
Positions on IFs

**Techno-enthusiasts**
- Return all potentially actionable results

**Genomic libertarians**
- Let people have what they want

**Genomic Fabians**
- Gradual introduction of return and evaluation

**Luddites**
- No to wider use of genomic tests

PCGF2
G→A Chr17:36,895,854
Public = 4961

Genetic health professionals = 533

Genomic researchers = 607

Other health professionals = 843

www.GenomEthics.org
Q: What influences attitudes the most?

A: Our professional background rather than the country we are from
Three key messages

1. On the whole, all stakeholders would be interested in receiving IFs
2. Actionability is important
3. Genetic health professionals are more conservative

• Hereditary non-polyposis colorectal cancer (HNPCC)/ Lynch syndrome
  • (genes: mismatch repair genes MLH1, MSH2, MSH6, PMS2) - adult onset**
• Familial adenomatous polyposis (FAP) (gene: APC)
• MYH-associated polyposis (MAP) (gene: MutYH)
• Hereditary, breast and ovarian cancer (genes: BRCA1 and BRCA2) - adult onset
• Von Hippel-Lindau syndrome (gene: VHL) - child and adult onset
• Multiple endocrine neoplasia type 1 (gene: MEN1) - child and adult onset
• Multiple endocrine neoplasia type 2 (gene: RET) - child and adult onset
• Familial medullary thyroid cancer (FMTC) (genes: RET and NTRK1) – child and adult onset
• Retinoblastoma (gene: RB1) – child onset
• Familial hypercholesterolaemia gene: LDLR- child onset- and also APOB and
• PCSK9 - child and adult onset
Genomic Data Sharing
Premise

• Data sharing endeavors rely on people willing for their donated data to be shared (i.e. ‘data donors’)

• Even if we aren’t personally donating, we’ll be related to someone who is, i.e. the ethical issues linked to data sharing are relevant to global publics

• Exemplary practice involves listening to what potential donors want, believe and fear and consider policy implications

• This work is part of GA4GH strategic roadmap
Diversity in genomic data

• Universal Declaration of Human Rights guarantees the rights of every individual in the world “to share in scientific advancement and its benefits”
• Existing genomic datasets are dominated by white European ancestry populations
• Increases the likelihood non-EA individuals will receive inconclusive or, erroneous interpretations of genomic variants.
Genomic and health data sharing
Global public survey

Sample size: 37,000 completed samples, ‘representative’ public recruited via Dynata (global market research company)
Willingness to donate one’s genomic data
Would you donate your anonymous DNA information and medical information for use by:

- Medical doctors
- Non-profit researchers
- For-profit researchers
Willingness to donate DNA and health information

Doctor
Willingness to donate DNA and health information

- Doctor
- Non-profit
Willingness to donate DNA and health information

Doctor | Non-profit | For-profit

Argentina | Australia | Belgium | Brazil | Canada | China | Egypt | France | Germany | India | Italy | Japan | Mexico | Pakistan | Poland | Portugal | Russia | Spain | Sweden | Switzerland | UK | USA

Bar chart showing the willingness to donate DNA and health information across various countries, categorized by Doctor, Non-profit, and For-profit sectors.
Across 22 countries, **global publics** are more comfortable with their data being used by **doctors** than **for-profit companies**.
What affects willingness?
• Who the recipient is
• Familiarity with genomics
• Perception that there is something special about genomic data that warrants donation
• Trust in the recipient
• Perceived harms from re-identification
• Ability to receive raw data back
• Reassurance of legal protections in place
Trust and Data Sharing are thought to go hand in hand

Trust is thought to shape attitudes towards genomics and intention to participate in research


Where trust is absent, the social license and mandate of researchers and clinicians to obtain and distribute data may be lost

(Carter et al 2015)
Total percentage trusting each organisation or individual with DNA and health information (global meta-analysis)

- Own doctor

Argentina
Australia
Belgium
Brazil
Canada
China
Egypt
France
Germany
India
Italy
Japan
Mexico
Pakistan
Poland
Portugal
Russian Federation
Spain
Sweden
Switzerland
United Kingdom
United States
Total percentage trusting each organisation or individual with DNA and health information (global meta-analysis)

- **Own doctor**
- **Any doctor in country**
Total percentage trusting each organisation or individual with DNA and health information (global meta-analysis)

- Own doctor
- Any doctor in country
- Non-profit researcher in my country
Total percentage trusting each organisation or individual with DNA and health information (global meta-analysis)

- Own doctor
- Any doctor in country
- Non-profit researcher in my country
- Company researcher in my country
- My government
Across 22 countries, there’s variation in who is trusted with data but the most trusted is a person’s own doctor.

Doctors play a gatekeeping role in supporting the development of large-scale data sharing initiatives.

Trust may be increased by clarity about who will use the data, for what purpose, who will benefit & how.
Deeper Analysis using English speaking data only

English speakers were first to be recruited, and also each set of country data will be analysed by each collaborator
Profile of the most ‘trusting participants’

• (USA, Canada, Australia, UK only)
  • More likely to be under 50, male, with children, hold religious beliefs, have personal experience of genetics and be from the USA. This profile are the most likely to be willing to donate data for any reason
  • Milne et al 2019 Trust paper
To support *responsible data sharing* practices we need to:

Ensure *diversity* amongst the professionals who *create data sharing policies*, *governance structures* and *legislation*

This is because the *profile of people* who are the most *trusting of the data sharing process* is very similar to the *profile of the decision makers* in genomics…

...under *age 50*, *male*, with *personal experience of genomics* and *from the USA*

The aim of Society and Ethics Research is to

• Explore the voice of publics to enable further discussion, debate, evaluation, ethical review

• Feed this work into
  • Policy
  • Governance
  • Regulation
It couldn’t have happened without....

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