Health and Genetics

Rebecca Balebako

Advisor: Dr. Lorrie Cranor
Agenda

• Quiz
• Schedule change
• Homework
• Intro to genetic privacy
• GINA: Employment Discrimination
• DNA Testing for Consumers
Schedule

• Guest Lecturer November 25\textsuperscript{th} on Drones
  – The readings will stay the same but the lectures switched.

• Today’s lecture – Genetic Privacy

• Reminder: November 20 – Draft project paper due
Homework Questions
How much do you already know about genomics?

• What is a genome?

• http://www.pbs.org/wgbh/nova/body/public-genomes.html
Genetic diversity

Our genomes are over 99% identical.

Remaining <1% difference => GENETIC VARIATION

Terminology:
How do we talk about our genetic differences?

MUTATIONS

VARIANTS
Complex relationship between your DNA and environment

Examples:

PKU (phenylketonuria): A genetic disease with an environmental cure (diet).

Inherited cancer susceptibility: Women with same BRCA1 variant differ in whether they develop cancer, type of cancer and age of onset.

Type 2 Diabetes: Common disease with environmental and genetic contributions.

http://www.flickr.com/photos/barl0w/3036412907
http://www.flickr.com/photos/wellcomeimages/5814818738/sizes/l/in/photostream/
DNA Testing for Consumers

• DTC testing does not produce full genome sequence (unlike Human Genome Project)

• Can report on
  – Ability to taste bitter flavors
  – Photic sneeze reflex
  – Risk for developing heart disease
  – Diabetes
23andme

- Sells genetic profiles on-line: $99
- Previously offered
  - health reports
  - chances of getting dozens of diseases
  - likely response to various drugs
- FDA said need to be approved as ‘medical device’
- Main business model ‘create a massive database’ so pharmaceutical and academic researchers can do trials more cheaply

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<th>Drug response</th>
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<td>Alcohol Consumption, Smoking and Risk of Esophageal Cancer</td>
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<tr>
<td>Oral Contraceptives, Hormone Replacement Therapy and Risk of Venous Thromboembolism ♀</td>
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<td>Fluorouracil Toxicity</td>
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<td>Pseudocholinesterase Deficiency</td>
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<td>Thiopurine Methyltransferase Deficiency  new</td>
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<td>Floxacillin Toxicity</td>
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<td>Heroin Addiction</td>
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Genetic Information Nondiscrimination Act (GINA)

• Signed into law 2008
• Protect people to encourage them to participate in DNA testing and research
• Employers can not use genetic info for hiring or promotion decisions
• Insurers can not use it to make decisions to add or drop people from policies
Class Discussion Choice

• GINA: Employment discrimination
• Personal Kits debate
GINA: Group Discussions

- You will be in an ‘expert’ and ‘home’ group.
- Each expert group will receive information on a case, which you will discuss.
- Then return to your home group and summarize what you learned.
GINA: Expert group questions

• How did the company use or try to use genetic information about its employees or job applicants?
• Was a person fired or not hired because of a genetic test or medical condition?
• Was there a lawsuit? If so, what was the result? Was an employee rehired, was there a settlement, etc.?
• Do you agree with how the case you studied was resolved? Why or why not?
DTC: Congressional Hearing

Characters who support direct-to-consumer (DTC) genetic testing (Panel A):

• Doctor A - Believes DTC testing is beneficial
• Patient A – Wants access to DTC genetic testing
• Founder of a DTC company
• Senator A – Leaning toward supporting DTC testing; questions witnesses

Characters who are against or doubtful of DTC genetic testing (Panel B):

• Doctor B - Thinks genetic testing through a doctor is valuable, but is skeptical of DTC testing
• Patient B – Against DTC genetic testing
• Senator B – Is skeptical of DTC tests; questions witnesses
DTC: Schedule

• 10 minutes: Work with your group to research or develop the position of your character

• Select one person to represent your group and make a quick statement (3-5 sentences)

• Senators will take turns ask questions
Genetics


• [www.pbs.org/nova/body/tanzi-genetic-tests.html](http://www.pbs.org/nova/body/tanzi-genetic-tests.html)

• [www.pbs.org/nova/body/public-genomes.html](http://www.pbs.org/nova/body/public-genomes.html)