Demystifying DNA
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available in paperback or on Kindle

Traditionally, we compile a family tree by:
- asking questions
- utilising birth, marriage and death (BMD) records, censuses, records, maps and
- surnames, places and anecdotes can give clues for paper trail

DNA testing
When I saw DNA tests available for purchase at a conference I was lecturing at, I bought the first test I saw - I didn't make an informed choice. I knew about 'paternity testing,' but didn't know much more about DNA testing.

When my DNA test results came back, I wasn't sure what to do next. I didn't understand the jargon, and the implications of the results were lost on me. I have subsequently discovered that different tests test different things and that each company has its own advantages and disadvantages; and the website layouts vary greatly.

I have subsequently learned that
- mtDNA traces the maternal line
- Y-DNA follows the male line: Y-DNA is passed down from father to son - inheritance pattern *typically* follows the surname
- autosomal DNA analyses the 22 pairs of non-sex chromosomes, which include one from the mother & one from the father; can tell you about both sides of the family

The 'big 5' companies are currently:
- Ancestry
- FTDNA
- Living DNA
- MyHeritage
- 23&Me

Popularity (by 2022)

- c38 million DTC tests sold
- if growth trends continue, by 2028, could be c100million
- customers learn about their INDIVIDUAL bio-geographical origins/ ancestry
- company produces individual reports for each consumer

DNA test results reveal
- ethnicity estimates
- annotated map
- a list of people that your DNA 'matches' (overlaps) with
- potential named relationships
- the opportunity to contact matches and collaborate if you both want to
- website generated hints
- some (varied) advanced tools

Utilise known relationship DNA results
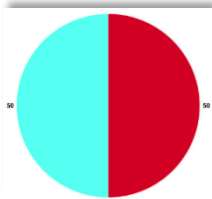
After my children and my eldest grand-daughter did a DNA test, I could see a picture emerging. I knew our relationships, and could work out our percentage biological overlaps; for example, my daughter would inherit c50% from me, and my grand-daughter would inherit c25%, and so on.
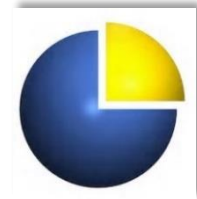
- my oldest daughter shares 3,421 centimorgans (CMs) across 78 DNA segments with me - labelled 'parent/ child'
- my 6 children range from 3,421-3,488cM shared across 73-85 segments
- my eldest granddaughter shares 1,567 cMs across 42 DNA segments with me (approx. half of my daughter?) but is labelled 'close family to 1st cousin'
- my grandchildren range from 1,567-1,627cM shared across 42-46 segments

Approximate amount of shared DNA (in centimorgans)	Possible relationship
3,475	Parent, child, or identical twin
2,400—2,800	Full sibling (including fraternal twins)
1,450—2,050	Grandparent, aunt, uncle, half—sibling
680—1,150	1st cousin, great—grandparent
200—620	2nd cousin
90—180	3rd cousin
20—85	4th cousin
6—20	Distant cousin: 5th cousin — 8th cousins

Generalise to unknown relationship DNA matches

A consanguinity chart (Tierney) is useful, especially for adopted people who may not have as much factual information as other people.
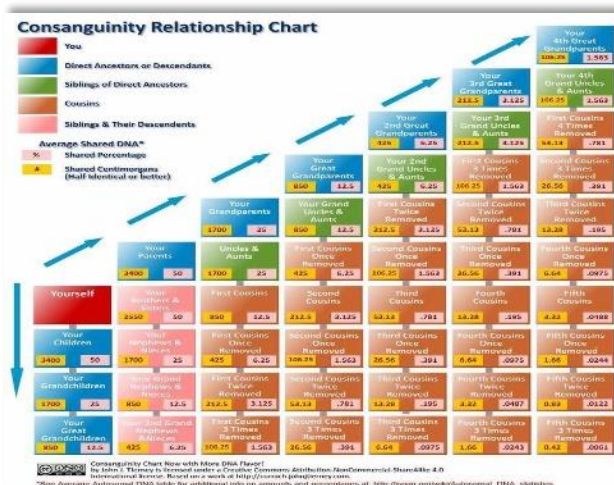
• my highest DNA match shares 332 cMs shared across 17 DNA segments, predicted 2nd cousin - hasn't replied to messages; added some information from her public tree
• next highest DNA match shares 32 cMs shared across 3 DNA segments, predicted 4th to 6th cousin - we collaborated fully which broadened my knowledge of that branch of my tree and we discovered we had great grandparents as MRCA (most recent common ancestors)

Practice tree

Look at potential relationships from amount of DNA overlap, then insert into possible positions on a practice tree, utilising names and places.

Worked example
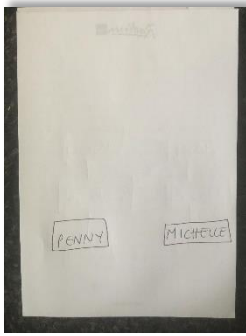
Shared DNA: 6.2% (437.4 cM); shared segments 15; largest segment 82.8 cM
DNA predicted relationship: 1st cousin once removed/ 1st cousin twice removed/ 2nd cousin
tree relationship: 1st cousin once removed
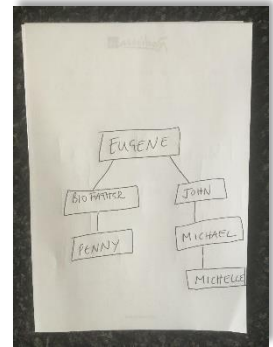
Be open to a range of possible relationships based on DNA
- match - shared 32cM across 3 segments, predicted 4th - 6th cousin
- actual relationship = 3rd cousin - different to the predicted 1
- the tree position would have been incorrect
- his mother: shared 121 cM across 7 DNA segments, predicted 3rd - 4th cousin
- actual relationship = 2nd cousin once removed

**You should decide which relatives you're searching for and the 'why' will then inform the 'how'**
- searching for bio family?
- specifically interested in DNA angle?
- broaden your tree and your narrative?

Choose who to 'usefully' DNA test
- ideally test elders: available parent/ grandparent/ aunt/ uncle
- no point testing people with the same relationship to you, for example, your 3 siblings
- test someone with a distant but known relationship to you

Also, upload DNA results to other sites, as they have different consumers and also different advanced tools to use.

Ethnicity and inheritance
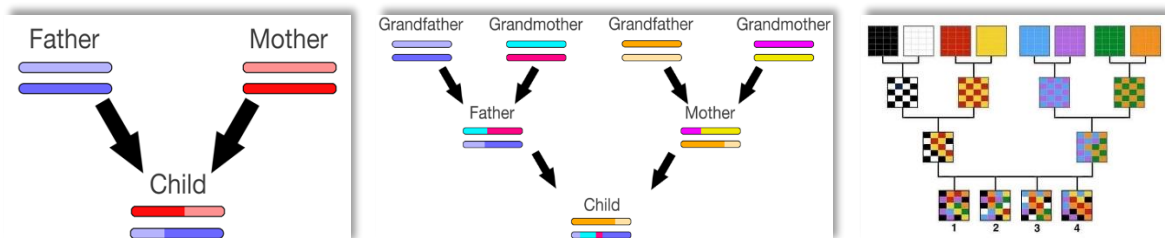
- inheritance seems somewhat randomly inherited from ancestors
- can raise ethical dilemmas with unexpected ethnicities
- may reveal lost/ hidden ethnicities or religion (Jewish)
- can raise (unfounded) doubts about paternity

GedMatch
You can also download your DNA data, and then upload it to GEDmatch which compares the main DNA testing websites, and gives more insights. I had 250 matches on Ancestry, and over 1,000 on GedMatch. Many of those people had tested on other sites, and we would never have overlapped on the separate sites we had chosen. A really useful column on that site is MRCA, most recent common ancestor, which reveals how many generations ago you and your match overlap. There is
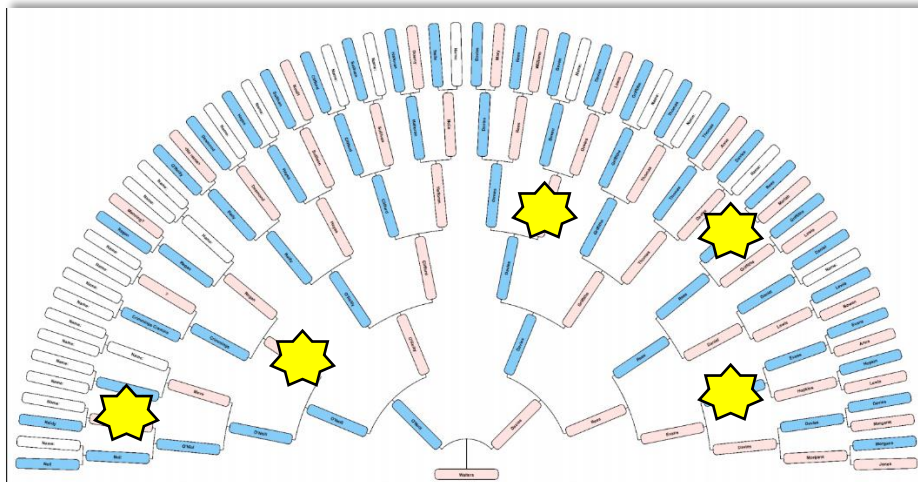
also the potential for triangulation, where you can see if 2 known relatives overlap with each other, and eliminating people who don't match both.

- 1.4 million members (2022), 45+ DNA tools, 350m people in GEDcoms

I use the following often:

- useful how-to videos
- one-to-one comparisons
- chromosome browser
- MRCA column

Insert DNA matches into verified positions in your tree

Useful tools:

- DNA painter
- Excel spreadsheets
- grouping methods
- Leeds method colour clustering
- AutoClusters - groups together DNA Matches that likely descend from common ancestors, in a visual chart

Ethical dilemmas

'I'm only doing my tree, what problems can there be?'

- privacy and confidentiality issues
- DNA - very new (do we understand it all)
- opening up 'a can of worms' (secrets and lies)
- DNA doesn't lie, but results can be misinterpreted
- unexpected uses of DNA (3rd parties)

Stay in touch:
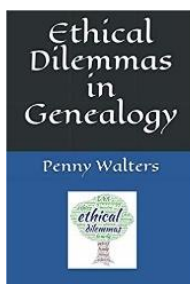
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