Advancements in Relationship Predictions

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Advancements in relationship predictions

A person is asking for help with a surprise DNA match. They share 1,763 centiMorgans over 49 segments and can see that the match is on their paternal side. What's the relationship?

Traditional Relationship Predictions

Enter the total cMs shared

cMs = centiMorgans

Enter the total number of cM for your match here:

1111

reset

or enter %

Then any relationships that fit will stand out below

You will need to scroll the page to the right to see all relationships

Click here for a shareable link to the cM amount above

Most distant common ancestors
Assuming no pedigree collapse or endogamy, and that you're related in just one way, the **furthest** back you might need to go to find common ancestors for a match of 1111cM is **Great-Grandparent level** or generation 4 on your pedigree chart.

The connection may be closer. *Also, depending on your family, this match could be a close younger generation relative, such as the descendant of your sibling.*

Relationship probabilities (based on stats from The DNA Geek)
New: View these relationships in a tree

See the probability for the most likely group of relationships

98%	Great-Grandparent Great-Aunt / Uncle
	Half Aunt / Uncle 1C
	Half Niece / Nephew
	Great-Niece / Nephew Great-Grandchild

See less probable relationships

2%	Half Sibling † Aunt / Uncle †
	Niece / Nephew † Grandparent
	Grandchild

https://dnapainter.com/tools/sharedcmv4

Why not just look at the ranges of shared DNA?

| Relationship	Lower (cMs)	Average (cMs)	Upper (cMs)
Full Sibling	2,191	2,592	2,952
Paternal Half Sibling	1,190	1,719	2,250
Maternal Half Sibling	1,314	1,719	2,122
Patrilineal 1st Cousin	462	837	1,260
Matrilineal 1st Cousin	503	827	1,188
Half 1st Cousin	145	415	760
2nd Cousin	39	198	428

Data simulated from Ped-sim. Averages and ranges are similar to what you would see at AncestryDNA, MyHeritage, or FTDNA, but are based on the total cMs and low cM cutoff (8 cMs) at Ancestry.

Relationships with wider ranges of shared DNA are more probable at cM values far away from the mean
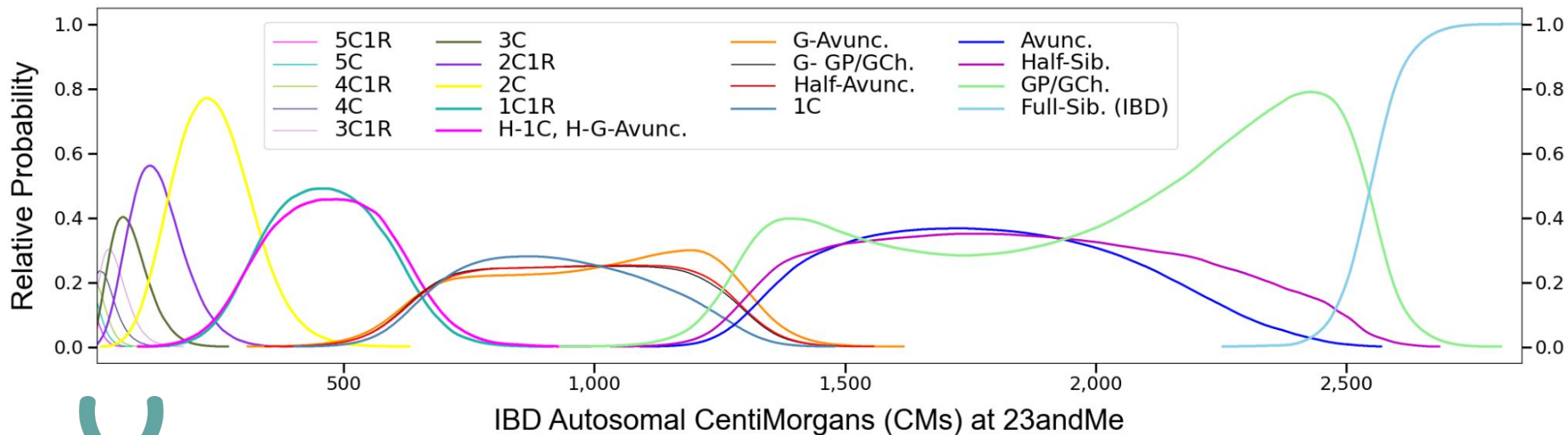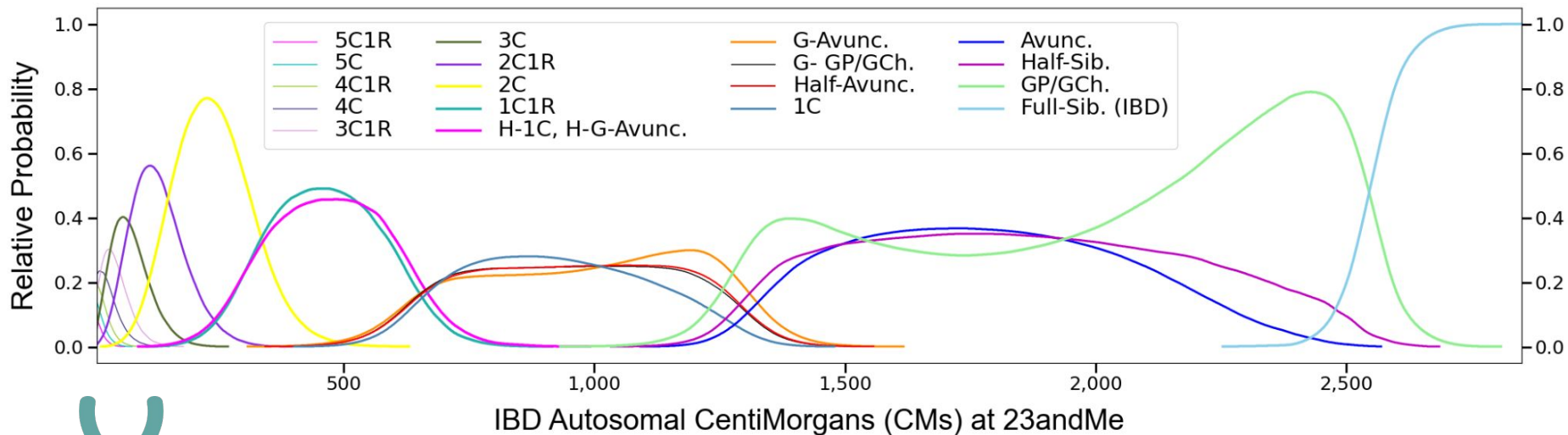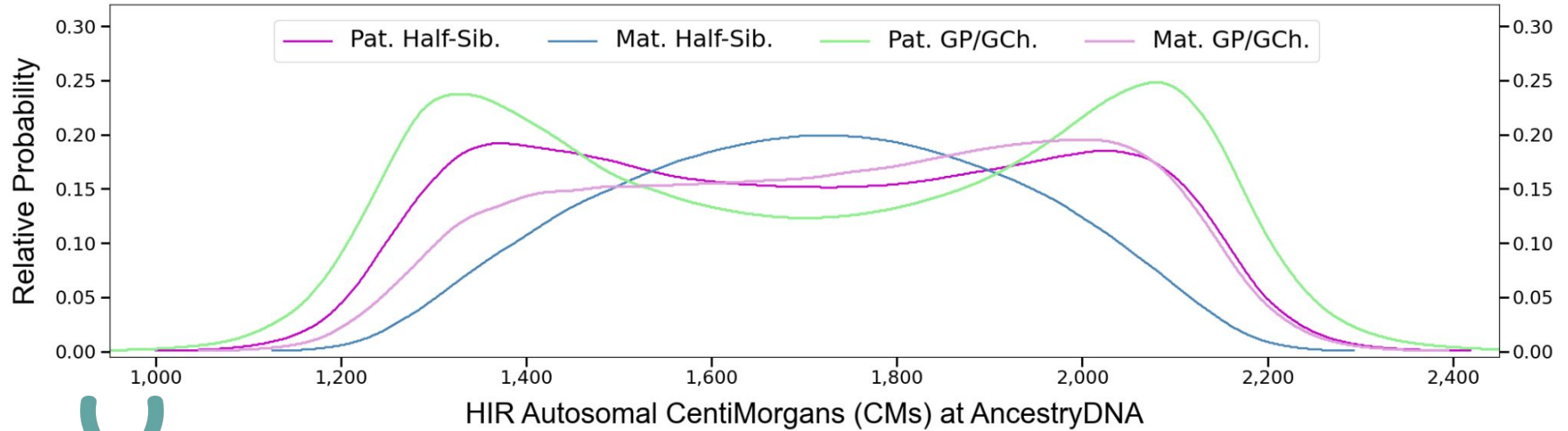
Relationships with wider ranges of shared DNA are more probable at cM values far away from the mean
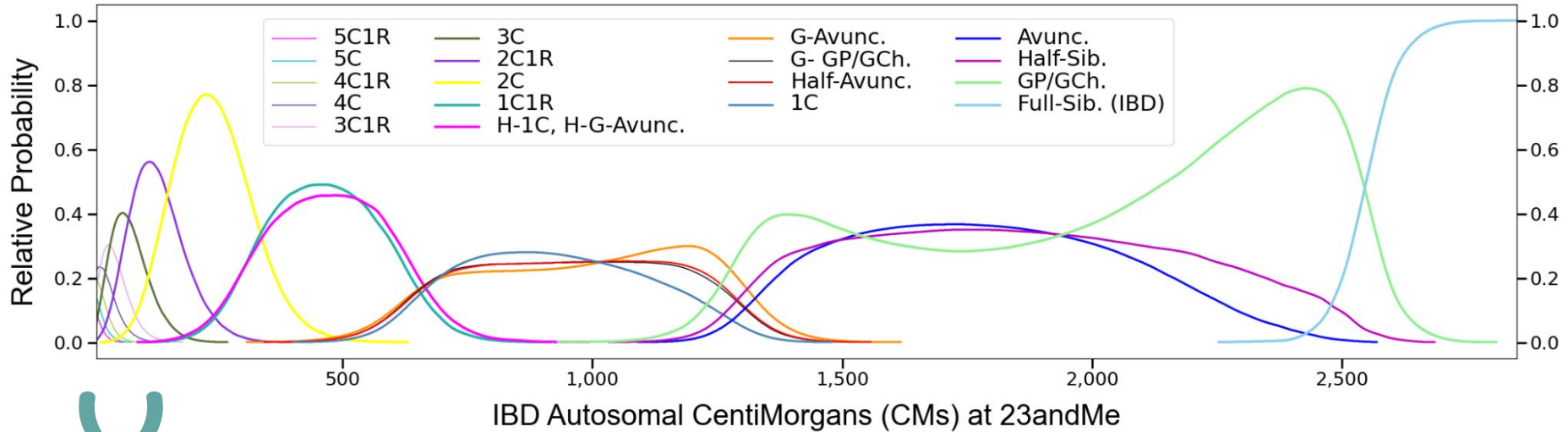
Relationships with wider ranges of shared DNA are more probable at cM values far away from the mean

Paternal relationships are more probable at cM values far away from the mean

Aunt/uncle/niece/nephew probabilities were included in the calculations, but are not shown

Differences between maternal and paternal relationships

- 38.2% shared between a woman and her paternal grandmother

- This relationship always shares a full X Chromosome copy

- Her father has tested and shares 50% with both women

🔒 dna-sci.com

| 23andMe cMs | 38.2 | Female-Female ⇕ |

23andMe cMs **23andMe %** **Sexes of the testers**

Submit

Relationship Type	Probability	Group
*Full-Sibling		**79.4%**
Grandparent/Grandchild		**19.8%**
Paternal	19.7%	
Maternal	0.1%	
Half-Sibling		**0.9%**
Paternal	0.9%	

Predictions from dna-sci.com

Orogen predictions at dna-sci.com

- Released in February of 2022

- Based only on total shared DNA–percentage or cMs

- The only predictions to use a peer-reviewed data source: Ped-sim developed at Cornell University

- All other relationship predictions have been developed at testing sites where methodologies are proprietary

- The Orogen methodology has been submitted to and published in a science journal: Forensic Science International, https://doi.org/10.1016/j.fsigss.2022.09.011

The new relationship predictor
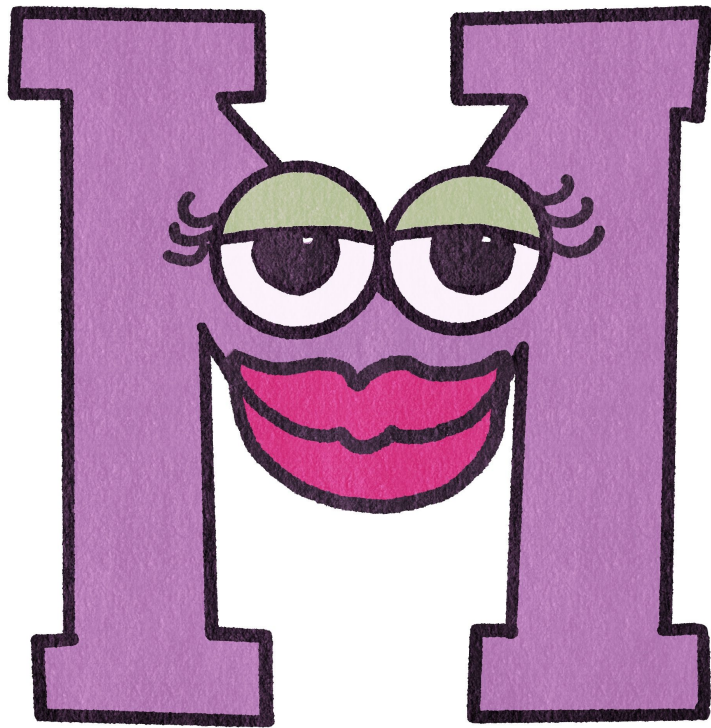
SegcM - Predictions that take the number of segments into account

The tool is available at
dna-sci.com/tools/SegcM
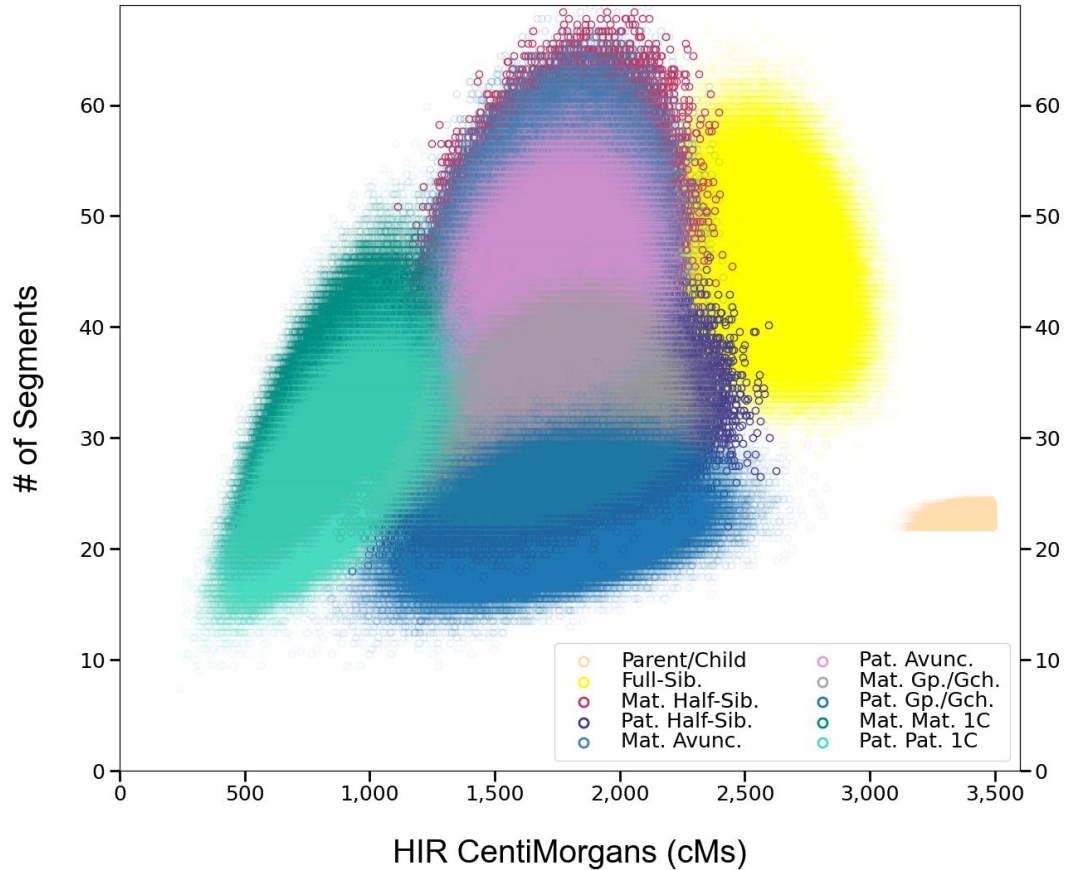
How to use SegcM

Enter the total cMs shared

🔒 dna-sci.com

| 1594 | 30 |

cMs   # of Segs.

Enter the number of segments shared

Submit

See all of the possible relationships

1,594 cMs and 30 segments

Relationship Type	Probability	Group
Half-Sibling		**49.9%**
Paternal	49.9%	
Grandparent/Grandchild		**49.6%**
Maternal	49.1%	
Paternal	0.5%	
Aunt/Uncle/Niece/Nephew		**0.4%**
Paternal	0.4%	

See the probability of each relationship and side

Close family predictions from SegcM

1887	36
cMs	# of Segs.

Submit

$$\frac{100\%}{3 \text{ relationships}}$$ ~= 33% per relationship

$$\frac{100\%}{6 \text{ relationship subtypes}}$$ ~= 17% per relationship

1,887 cMs and 36 segments

Relationship Type	Probability	Group
Half-Sibling		**46.8%**
Paternal	46.3%	
Maternal	0.5%	
Grandparent/Grandchild		**46.0%**
Maternal	45.9%	
Paternal	0.1%	
Aunt/Uncle/Niece/Nephew		**7.3%**
Paternal	6.5%	
Maternal	0.8%	

Relationship →

Subtype →

What's a good close family prediction?

dna-sci.com

1,398 cMs and 27 segments

Relationship Type	Probability	Group
Grandparent/Grandchild		**46.2%**
Maternal	42.8%	
Paternal	3.4%	
Half-Sibling		**44.1%**
Paternal	44.1%	
G-Grandparent/G-Grandchild		**5.4%**
Pat. Mat. or Mat. Pat. (x2)	2.1%	
Maternal Maternal	1.0%	
Paternal Paternal	0.2%	
Half- Aunt/Uncle/Niece/Nephew		**2.1%**
Paternal Paternal	1.4%	
Pat. Mat. or Mat. Pat. (x2)	0.3%	
Maternal Maternal	0.1%	
G- Aunt/Uncle/Niece/Nephew		**1.1%**
Paternal Paternal	0.4%	
Pat. Mat. or Mat. Pat. (x2)	0.3%	
Maternal Maternal	0.1%	
1st Cousin		**0.8%**
Paternal Paternal	0.3%	
Pat. Mat. or Mat. Pat. (x2)	0.2%	
Maternal Maternal	0.1%	
Aunt/Uncle/Niece/Nephew		**0.1%**
Paternal	0.1%	

Known paternal half sibling

dna-sci.com

1,398 cMs at Ancestry, FTDNA, or MyHeritage

Relationship Type	Probability	Group
Grandparent/Grandchild		**33.7%**
Paternal	20.3%	
Maternal	13.4%	
Aunt/Uncle/Niece/Nephew		**28.9%**
Paternal	14.9%	
Maternal	14.0%	
Half-Sibling		**27.9%**
Paternal	17.9%	
Maternal	10.0%	
G-Grandparent/G-Grandchild		**5.3%**
Paternal Paternal	2.5%	
Pat. Mat. or Mat. Pat. (x2)	1.2%	
Maternal Maternal	0.4%	
Half- Aunt/Uncle/Niece/Nephew		**2.2%**
Paternal Paternal	1.3%	
Pat. Mat. or Mat. Pat. (x2)	0.4%	
Maternal Maternal	0.1%	
G- Aunt/Uncle/Niece/Nephew		**1.7%**
Paternal Paternal	0.6%	
Pat. Mat. or Mat. Pat. (x2)	0.5%	
Maternal Maternal	0.1%	
1st Cousin		**0.4%**
Paternal Paternal	0.2%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	

90.5% if only using cMs

$$\frac{90.5\%}{6 \text{ relationships}}$$

~= 15% per relationship

Paternal and maternal designations

1,398 cMs and 27 segments

Relationship Type	Probability	Group
Grandparent/Grandchild		**46.2%**
Maternal	42.8%	
Paternal	3.4%	
Half-Sibling		**44.1%**
Paternal	44.1%	
G-Grandparent/G-Grandchild		**5.4%**
Pat. Mat. or Mat. Pat. (x2)	2.1%	
Maternal Maternal	1.0%	
Paternal Paternal	0.2%	
Half- Aunt/Uncle/Niece/Nephew		**2.1%**
Paternal Paternal	1.4%	
Pat. Mat. or Mat. Pat. (x2)	0.3%	
Maternal Maternal	0.1%	
G- Aunt/Uncle/Niece/Nephew		**1.1%**
Paternal Paternal	0.4%	
Pat. Mat. or Mat. Pat. (x2)	0.3%	
Maternal Maternal	0.1%	
1st Cousin		**0.8%**
Paternal Paternal	0.3%	
Pat. Mat. or Mat. Pat. (x2)	0.2%	
Maternal Maternal	0.1%	
Aunt/Uncle/Niece/Nephew		**0.1%**
Paternal	0.1%	

Paternal Maternal 1st Cousin	Father's Sister's Child
Paternal Maternal Half Aunt	Father's Mother's Child
Paternal Maternal Great Aunt	Father's Mother's Sibling

Close family predictions from SegcM

1674	18
cMs	# of Segs.

Submit

1,674 cMs and 18 segments

Relationship Type	Probability	Group
Grandparent/Grandchild		**100.0%**
Paternal	100.0%	

1741	18
cMs	# of Segs.

Submit

1,741 cMs and 18 segments

Relationship Type	Probability	Group
Grandparent/Grandchild		**100.0%**
Paternal	100.0%	

There's only one possibility for these two!

Close family predictions from SegcM

dna-sci.com

| 1763 | | 49 |
| cMs | | # of Segs. |

Submit

1,763 cMs and 49 segments

Relationship Type	Probability	Group
Aunt/Uncle/Niece/Nephew		**59.4%**
Maternal	38.5%	
Paternal	20.9%	
Half-Sibling		**40.6%**
Maternal	40.6%	

dna-sci.com

| 1860 | | 48 |
| cMs | | # of Segs. |

Submit

1,860 cMs and 48 segments

Relationship Type	Probability	Group
Aunt/Uncle/Niece/Nephew		**62.7%**
Maternal	35.1%	
Paternal	27.6%	
Half-Sibling		**37.3%**
Maternal	37.3%	

Newly discovered paternal aunt and uncle

Close family predictions from SegcM

🔒 dna-sci.com

908		25
cMs		# of Segs.

Submit

908 cMs and 25 segments

Relationship Type	Probability	Group
G- Aunt/Uncle/Niece/Nephew		**34.2%**
Paternal Paternal	13.8%	
Pat. Mat. or Mat. Pat. (x2)	8.3%	
Maternal Maternal	3.8%	
Half- Aunt/Uncle/Niece/Nephew		**33.1%**
Pat. Mat. or Mat. Pat. (x2)	12.3%	
Paternal Paternal	7.2%	
Maternal Maternal	1.3%	
G-Grandparent/G-Grandchild		**21.4%**
Maternal Maternal	12.8%	
Pat. Mat. or Mat. Pat. (x2)	3.9%	
Paternal Paternal	0.8%	
1st Cousin		**11.2%**
Paternal Paternal	5.1%	
Pat. Mat. or Mat. Pat. (x2)	2.5%	
Maternal Maternal	1.1%	
Half-1C Group		**0.2%**
Half-1C, Half-G or 2G Aunt/Uncle/Niece/Nephew	0.2%	

🔒 dna-sci.com

1872		50
cMs		# of Segs.

Submit

1,872 cMs and 50 segments

Relationship Type	Probability	Group
Aunt/Uncle/Niece/Nephew		**58.6%**
Maternal	37.6%	
Paternal	21.0%	
Half-Sibling		**41.3%**
Maternal	41.3%	

Newly discovered paternal uncle and paternal maternal half aunt

Maternal close family predictions from SegcM

🔒 dna-sci.com

1972		29
cMs		# of Segs.

Submit

1,972 cMs and 29 segments

Relationship Type	Probability	Group
Grandparent/Grandchild		**57.3%**
Maternal	46.6%	
Paternal	10.7%	
Half-Sibling		**42.5%**
Paternal	42.5%	
Aunt/Uncle/Niece/Nephew		**0.2%**
Paternal	0.2%	

Newly discovered pair of maternal grandparents

🔒 dna-sci.com

1537		29
cMs		# of Segs.

Submit

1,537 cMs and 29 segments

Relationship Type	Probability	Group
Half-Sibling		**49.6%**
Paternal	49.6%	
Grandparent/Grandchild		**49.6%**
Maternal	48.6%	
Paternal	1.0%	
G-Grandparent/G-Grandchild		**0.3%**
Maternal Maternal	0.1%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	
Aunt/Uncle/Niece/Nephew		**0.2%**
Paternal	0.2%	
Half- Aunt/Uncle/Niece/Nephew		**0.1%**
Paternal Paternal	0.1%	

How can we compare predictors?

$$\frac{100\%}{6 \text{ relationships}}$$

~= 17% per relationship

100%	Grandparent	Aunt / Uncle
	Half Sibling	Niece / Nephew
	Grandchild	
~ 0%	** Sibling	

https://dnapainter.com/tools/sharedcmv4

🔒 dna-sci.com

1887	36
cMs	# of Segs.

Submit

1,887 cMs and 36 segments

Relationship Type	Probability	Group
Half-Sibling		**46.8%**
Paternal	46.3%	
Maternal	0.5%	
Grandparent/Grandchild		**46.0%**
Maternal	45.9%	
Paternal	0.1%	
Aunt/Uncle/Niece/Nephew		**7.3%**
Paternal	6.5%	
Maternal	0.8%	

1st cousins once removed and half 1st cousins

1C1R and half 1C are usually thought to have the same properties of shared DNA: 6.25% average

516 cMs and 31 segments

Relationship Type	Probability	Group
1st Cousin, Once Removed		**77.3%**
1st Cousin		**6.9%**
Maternal Maternal	4.1%	
Pat. Mat. or Mat. Pat. (x2)	1.0%	
Paternal Paternal	0.8%	
G- Aunt/Uncle/Niece/Nephew		**3.8%**
Maternal Maternal	2.2%	
Paternal Paternal	0.6%	
Pat. Mat. or Mat. Pat. (x2)	0.5%	
Half- Aunt/Uncle/Niece/Nephew		**3.6%**
Maternal Maternal	2.7%	
Pat. Mat. or Mat. Pat. (x2)	0.4%	
Paternal Paternal	0.1%	
Half-1C Group		**3.2%**
Half-1C, Half-G or 2G Aunt/Uncle/Niece/Nephew	3.2%	
G-Grandparent/G-Grandchild		**0.8%**
Maternal Maternal	0.6%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	
2C Group		**0.3%**
2C, 1C2R, Half-1C1R, Half-2G- Aunt/Uncle/Niece/Nephew	0.3%	

453 cMs and 28 segments

Relationship Type	Probability	Group
1st Cousin, Once Removed		**87.7%**
Half-1C Group		**5.0%**
Half-1C, Half-G or 2G Aunt/Uncle/Niece/Nephew	5.0%	
1st Cousin		**2.0%**
Maternal Maternal	1.2%	
Pat. Mat. or Mat. Pat. (x2)	0.3%	
Paternal Paternal	0.2%	
2C Group		**1.6%**
2C, 1C2R, Half-1C1R, Half-2G- Aunt/Uncle/Niece/Nephew	1.6%	
G- Aunt/Uncle/Niece/Nephew		**1.2%**
Maternal Maternal	0.6%	
Pat. Mat. or Mat. Pat. (x2)	0.2%	
Paternal Paternal	0.2%	
Half- Aunt/Uncle/Niece/Nephew		**1.0%**
Maternal Maternal	0.8%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	
G-Grandparent/G-Grandchild		**0.2%**
Maternal Maternal	0.2%	

451 cMs and 14 segments

Relationship Type	Probability	Group
Half-1C Group		**61.8%**
Half-1C, Half-G or 2G Aunt/Uncle/Niece/Nephew	61.8%	
1st Cousin, Once Removed		**30.6%**
2C Group		**4.1%**
2C, 1C2R, Half-1C1R, Half-2G- Aunt/Uncle/Niece/Nephew	4.1%	
G-Grandparent/G-Grandchild		**1.3%**
Pat. Mat. or Mat. Pat. (x2)	0.4%	
Paternal Paternal	0.4%	
Maternal Maternal	0.1%	
Half- Aunt/Uncle/Niece/Nephew		**0.7%**
Paternal Paternal	0.5%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	
G- Aunt/Uncle/Niece/Nephew		**0.4%**
Paternal Paternal	0.2%	
Pat. Mat. or Mat. Pat. (x2)	0.1%	
1st Cousin		**0.1%**
Paternal Paternal	0.1%	

Extended family to 1st cousins, group probabilities

Actual Relationship	Total cMs	# of Segments	SegcM Group Prob.	Orogen Group Prob.	DNA Painter Group Prob.
1C	823	31	99%	98%	96%
Half niece	744	25	95%	91%	84%
Half 1C1R	522	17	1%	1%	3%
1C1R	478	24	91%	95%	89%
Parent's 1C	477	23	91%	95%	89%
2C	460	17	3%	4%	10%
1C1R	410	16	89%	88%	77%
1C1R	382	17	84%	79%	69%
Half great-nephew	379	16	82%	77%	68%
Half great-nephew	330	13	54%	53%	46%
2C1R	223	8	13%	21%	37%
Half great-nephew	218	10	7%	5%	7%
2C	213	9	78%	68%	49%
1C2R	183	8	71%	53%	50%
3C	167	6	9%	9%	13%
2C	156	7	35%	35%	26%
2C	151	9	32%	32%	24%
3C	103	5	34%	34%	30%
2C1R	87	7	29.0%	29.0%	30%
Average			**52%**	**51%**	**47%**

SegcM highest: 63%

Orogen 2nd highest: 73%

Ancestry simulated data: lowest probability 68% of the time

Data obtained from here: https://dna-explained.com/category/cm-explainer/

Extended family to 1st cousins, individual relationships

SegcM highest: 50%

Orogen 2nd highest: 90%

Ancestry simulated data: lowest probability 68% of the time

Individual Prob.

Actual Relationship	Total cMs	# of Segments	SegcM Ind. Prob.	Orogen Ind. Prob.	DNA Painter Ind. Prob.	SegcM Group Prob.	Orogen Group Prob.	DNA Painter Group Prob.
1C	823	31	46%	28%	24%	99%	98%	96%
Half niece	744	25	26%	22%	21%	95%	91%	84%
Half 1C1R	522	17	1%	1%	2%	1%	1%	3%
1C1R	478	24	76%	48%	45%	91%	95%	89%
Parent's 1C	477	23	73%	48%	45%	91%	95%	89%
2C	460	17	3%	4%	5%	3%	4%	10%
1C1R	410	16	47%	45%	39%	89%	88%	77%
1C1R	382	17	53%	41%	35%	84%	79%	69%
Half great-nephew	379	16	34%	37%	34%	82%	77%	68%
Half great-nephew	330	13	45%	25%	23%	54%	53%	46%
2C1R	223	8	13%	21%	37%	13%	21%	37%
Half great-nephew	218	10	7%	3%	4%	7%	5%	7%
2C	213	9	78%	68%	49%	78%	68%	49%
1C2R	183	8	71%	53%	50%	71%	53%	50%
3C	167	6	9%	9%	13%	9%	9%	13%
2C	156	7	35%	35%	26%	35%	35%	26%
2C	151	9	32%	32%	24%	32%	32%	24%
3C	103	5	34%	34%	30%	34%	34%	30%
2C1R	87	7	29%	29%	30%	29.0%	29.0%	30%
Average			**37%**	**31%**	**28%**	**52%**	**51%**	**47%**

Data obtained from here: https://dna-explained.com/category/cm-explainer/

A 2nd cousin pair from Roberta's dataset

🔒 dna-sci.com

213

9

cMs

# of Segs.

Submit

213 cMs and 9 segments

Relationship Type	Probability	Group
2C Group		**77.7%**
2C, 1C2R, Half-1C1R, Half-2G-Aunt/Uncle/Niece/Nephew	77.7%	
2C1R Group		**11.0%**
2C1R, Half-2C, Half-1C2R, 1C3R	11.0%	
Half-1C Group		**6.3%**
Half-1C, Half-G or 2G Aunt/Uncle/Niece/Nephew	6.3%	
1st Cousin, Once Removed		**4.8%**
3C Group		**0.2%**
3C, 2C2R, Half-2C1R, Half-1C3R	0.2%	

Most distant common ancestors

Assuming no pedigree collapse or endogamy, and that you're related in just one way, the **furthest** back you might need to go to find common ancestors for a match of 213cM is **3rd-Great-Grandparent level** or generation 6 on your pedigree chart.

The connection may be closer.

Relationship probabilities (based on stats from The DNA Geek)
👆 Click on any relationship to view a histogram
New: View these relationships in a tree

49%	*Half GG-Aunt / Uncle 2C Half 1C1R 1C2R Half GG-Niece / Nephew*
41%	*Half 2C 2C1R Half 1C2R 1C3R*
6%	*Great-Great-Aunt / Uncle Half Great-Aunt / Uncle Half 1C 1C1R Half Great-Niece / Nephew Great-Great-Niece / Nephew*
5%	*Half 1C3R † Half 2C1R † 3C 2C2R*

† this relationship has a positive probability for 213cM in thednageek's table of probabilities, but falls outside the bounds of the recorded cM range (99th percentile)

https://dnapainter.com/tools/sharedcmv4

MyHeritage predictions

Shared DNA (cM)
1888

Your age
*Optional*

Match's age
Optional

Submit

Most probable relationships: **Uncle/Aunt, Nephew/Niece**

Possible relationships

Relationship	Probability		Most Recent Common Ancestor(s)
Uncle/Aunt	**29.2%**		Grandparents
Nephew/Niece	**28.6%**		Parents
Grandchild	**14.3%**		You
Grandparent	**14.3%**		Grandparent
Half sibling ❓	**13.6%**		Parent

Show fewer possible relationships ⌃

Comparing MyHeritage to other predictors

Close Family Relationships
Half Sibling
Aunt/Uncle
Niece/Nephew
Grandparent
Grandchild

→ 33%

→ 17%

→ 17%

→ 17%

→ 17%
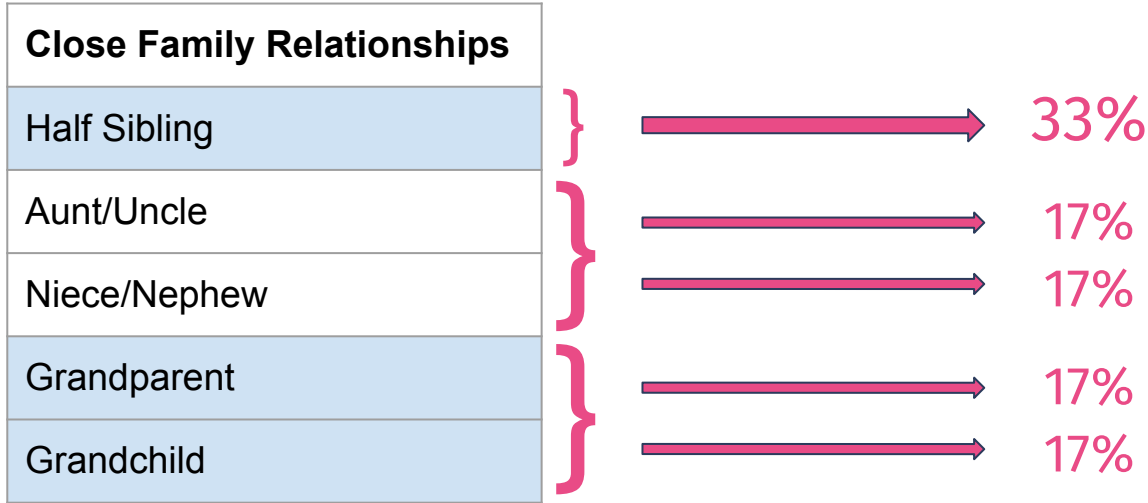
There are still only three major relationships

- Grandparent/Grandchild has two different perspectives for which ages matter
- Aunt/uncle/niece/nephew has two different perspectives
- Half sibling only has one perspective

MyHeritage and SegcM for a maternal uncle

Shared DNA (cM)
1849

Your age
Redacted
Optional

Match's age
Redacted
Optional

Submit

Possible relationships

Relationship	Probability
Nephew/Niece	**100%**

modified from https://myheritage.com/cm

50% for maternal nephew
50% for paternal nephew

🔒 dna-sci.com

1849

63

cMs   # of Segs.

Submit

1,849 cMs and 63 segments

Relationship Type	Probability	Group
Half-Sibling		**54.6%**
Maternal	54.6%	
Aunt/Uncle/Niece/Nephew		**44.7%**
Maternal	42.6%	
Paternal	2.1%	
***Full-Sibling**		**0.6%**

21.3% for maternal nephew
21.3% for maternal uncle

https://dna-sci.com/tools/SegcM

MyHeritage and SegcM for my maternal half sibling

Shared DNA (cM)
1932

Your age
Redacted

Optional

Match's age
Redacted

Optional

Submit

Possible relationships

Relationship	Probability
Half sibling ❓	**86.2%**
Nephew/Niece	**11.7%**
Sibling	**2.1%**

modified from https://myheritage.com/cm

43.1% for paternal half siblings
43.1% for maternal half siblings

🔒 dna-sci.com

1932   57

cMs   # of Segs.

Submit

1,932 cMs and 57 segments

Relationship Type	Probability	Group
Half-Sibling		**50.0%**
Maternal	50.0%	
Aunt/Uncle/Niece/Nephew		**48.6%**
Maternal	41.3%	
Paternal	7.3%	
*Full-Sibling		**1.4%**

https://dna-sci.com/tools/SegcM

MyHeritage and Ancestry for my maternal half sibling

Most distant common ancestors

Assuming no pedigree collapse or endogamy, and that you're related in just one way, the **furthest** back you might need to go to find common ancestors for a match of 1932cM is **Grandparent level.**

The connection may be closer. *Also, depending on your family, this match could be a close younger generation relative, such as the descendant of your sibling.*

Relationship probabilities (based on stats from The DNA Geek)
New: View these relationships in a tree

100%	*Grandparent Aunt / Uncle Half Sibling* *Niece / Nephew Grandchild*
0.28%	*Sibling*

https://dnapainter.com/tools/sharedcmv4

Shared DNA (cM)
1932

Your age
Redacted
Optional

Match's age
Redacted
Optional

Submit

Possible relationships

Relationship	Probability	
Half sibling ❓	**86.2%**	
Nephew/Niece	**11.7%**	
Sibling	**2.1%**	

modified from https://myheritage.com/cm

99.72%
——————————
3 relationships

~= 33.2% per relationship

Population weights

Relationship	Number (SR = 2)	Number (SR = 2.5)
Full Sibling	1	1.5
Aunt/Uncle	2	3
1st Cousin	4	7.5
2nd Cousin	16	38
3rd Cousin	64	190
4th Cousin	256	940
5th Cousin	1,024	4,700
6th Cousin	4,096	23,000

x4 each gen.

x5 each gen.

SR = Survival Rate
Right-column numbers are similar to Henn et al. (2012)

How to tell which predictors have population weights

DNA-Sci Weighted   DNA-Sci Unweighted   Ancestry 2019 (Beta)   MyHeritage

DNA-Sci Weighted

🔒 dna-sci.com

8 cMs at Ancestry, FTDNA, or MyHeritage

Relationship Type	Probability	Group
8C1R Group		**20.9%**
8C1R, Half-8C, Half-7C2R, 7C3R	20.9%	
8C Group		**16.4%**
8C, 7C2R, Half-7C1R, Half-6C3R	16.4%	
7C1R Group		**13.8%**
7C1R, Half-7C, Half-6C2R, 6C3R	13.8%	
7C Group		**13.2%**
7C, 6C2R, Half-6C1R, Half-5C3R	13.2%	
6C1R Group		**10.4%**
6C1R, Half-6C, Half-5C2R, 5C3R	10.4%	
6C Group		**8.1%**
6C, 5C2R, Half-5C1R, Half-4C3R	8.1%	
5C1R Group		**6.8%**
5C1R, Half-5C, Half-4C2R, 4C3R	6.8%	
5C Group		**4.8%**
5C, 4C2R, Half-4C1R, Half-3C3R	4.8%	
4C1R Group		**3.1%**
4C1R, Half-4C, Half-3C2R, 3C3R	3.1%	
4C Group		**1.7%**
4C, 3C2R, Half-3C1R, Half-2C3R	1.7%	
3C1R Group		**0.7%**
3C1R, Half-3C, Half-2C2R, 2C3R	0.7%	
3C Group		**0.1%**
3C, 2C2R, Half-2C1R, Half-1C3R	0.1%	

DNA-Sci Unweighted

🔒 dna-sci.com

8 cMs

Relationship Type	Probability	Group
4C Group		**22.5%**
4C, 3C2R, Half-3C1R, Half-2C3R	22.5%	
3C1R Group		**19.7%**
3C1R, Half-3C, Half-2C2R, 2C3R	19.7%	
4C1R Group		**18.6%**
4C1R, Half-4C, Half-3C2R, 3C3R	18.6%	
5C Group		**12.6%**
5C, 4C2R, Half-4C1R, Half-3C3R	12.6%	
3C Group		**8.2%**
3C, 2C2R, Half-2C1R, Half-1C3R	8.2%	
5C1R Group		**7.8%**
5C1R, Half-5C, Half-4C2R, 4C3R	7.8%	
6C Group		**4.4%**
6C, 5C2R, Half-5C1R, Half-4C3R	4.4%	
6C1R Group		**2.4%**
6C1R, Half-6C, Half-5C2R, 5C3R	2.4%	
7C Group		**1.4%**
7C, 6C2R, Half-6C1R, Half-5C3R	1.4%	
2C1R Group		**1.2%**
2C1R, Half-2C, Half-1C2R, 1C3R	1.2%	
7C1R Group		**0.7%**
7C1R, Half-7C, Half-6C2R, 6C3R	0.7%	
8C Group		**0.3%**
8C, 7C2R, Half-7C1R, Half-6C3R	0.3%	
8C1R Group		**0.2%**
8C1R, Half-8C. Half-7C2R. 7C3R	0.2%	

Ancestry 2019 (Beta)

Most distant common ancestors
A match of 8cM has a wide range of possible relationships. The connection may be within 8th-Great-Grandparent level, but the common ancestors could also be 20 or more generations back.

Relationship probabilities (based on stats from The DNA Geek)
New: View these relationships in a tree

%	Relationships
21%	4C Half 3C1R 3C2R
19%	Half 3C 3C1R Half 2C2R 2C3R
17%	6C 6C1R 6C2R 5C1R 7C 5C2R 7C1R 4C3R 5C3R 8C or more distant
17%	4C1R Half 3C2R 3C3R
12%	5C 4C2R
10%	3C Half 2C1R 2C2R Half 1C3R
1%	* GGGG Aunt / Uncle Great-Great-Great-Great-Aunt / Uncle Half Great-Great-Great-Aunt / Uncle 1C3R 2C1R Half 1C2R Half 2C
0.50%	* Great-Great-Great-Grandparent Great-Great-Great-Grandchild GGG Aunt / Uncle Great-Great-Great-Aunt / Uncle Half GG-Niece / Nephew Half GG-Aunt / Uncle Half Great-Great-Niece / Nephew Half Great-Great-Aunt / Uncle Half Great-Great-Niece / Nephew 1C2R 2C Half 1C1R

* this set of relationships has a positive probability for 8cM in thednageek's table of probabilities, but falls outside the bounds of the shared cM project (99th percentile)

https://dnapainter.com/tools/sharedcmv4-beta

MyHeritage

Shared DNA (cM): **8**   Your age: *Optional*

Possible relationships

Relationship	Probability
5th cousin	19.9%
4th cousin's child	16.2%
Parent's 4th cousin	16.2%
6th cousin	12.5%
5th cousin's child	6.2%
Parent's 5th cousin	6.2%
4th cousin's grandchild	6.0%
Grandparent's 4th cousin	6.0%
4th cousin	5.4%
3rd cousin's child	1.5%
Parent's 3rd cousin	1.5%
3rd cousin's grandchild	1.2%
Grandparent's 3rd cousin	1.2%

Show fewer possible relationships ^

modified from
https://myheritage.com/cm

209 data points

Relationship	Best Possible from Groups	SegcM Ind. Prob.	DNA Painter Ind. Prob.	Improvement
Parent/Child	100%	100%	100%	1.0
Full Sibling	100%	100%	99.9%	1.0
Pat. Half Sibling	16.6%	43.5%	16.5%	2.6
Mat. Half Sibling	16.6%	39.3%	16.5%	2.4
Pat. Avunc.	16.6%	34.6%	16.6%	2.1
Mat. Avunc.	16.6%	39.1%	16.3%	2.4
Pat. Gp./Gch.	16.6%	95.7%	16.6%	5.8
Mat. Gp./Gch.	16.6%	40.6%	16.4%	2.5
1st Cousin Group	6.3%	11.0%	5.5%	2.0
1st Cousin Once Removed	50%	45.0%	39.2%	1.1

All average individual probabilities, even for the 1C group

dna-sci.com/survey

209 data points

Relationship	Best Possible from Groups	SegcM Ind. Prob.	DNA Painter Ind. Prob.	Improvement
Parent/Child	100%	100%	100%	1.0
Full Sibling	100%	100%	99.9%	1.0
Pat. Half Sibling	16.6%	43.5%	16.5%	2.6
Mat. Half Sibling	16.6%	39.3%	16.5%	2.4
Pat. Avunc.	16.6%	34.6%	16.6%	2.1
Mat. Avunc.	16.6%	39.1%	16.3%	2.4
Pat. Gp./Gch.	16.6%	95.7%	16.6%	5.8
Mat. Gp./Gch.	16.6%	40.6%	16.4%	2.5
1st Cousin Group	6.3%	11.0%	5.5%	2.0
1st Cousin Once Removed	50%	45.0%	39.2%	1.1

All average individual probabilities, even for the 1C group

dna-sci.com/survey

SegcM

References

SegcM can be found at https://dna-sci.com/tools/segcm/

A double cousin predictor: https://dna-sci.com/tools/orogen-mult-unw/

Ped-sim:

Caballero et al. (2019): https://doi.org/10.1371/journal.pgen.1007979

Using the refined genetic map of Béhrer et al. (2017):
https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1007979

And the crossover interference parameters of Campbell et al. (2015):
https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1007979

Population weights from Henn et al. (2012):
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0034267

This presentation used a template from Slidesgo: https://slidesgo.com/
 and Freepik: https://www.freepik.com/

These predictions are not the same

The prediction on the right is not better than the one on the left. 89% probability for the correct relationship is much better than 100% for six relationships (17% per relationship)

The new relationship predictor