



4. Kinship Paper Challenge

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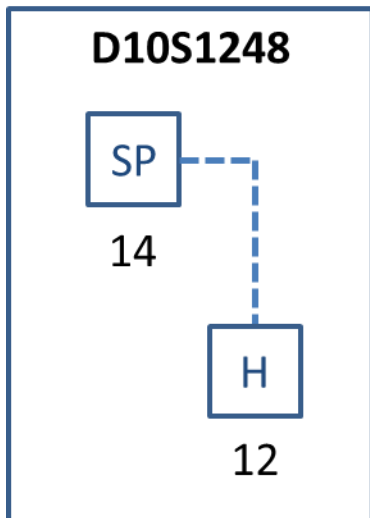
Nádia Pinto (npinto@ipatimup.pt)

4.1 Approach

After a woman dies her child claims for a paternity test of the man who is supposed to be his father. The test is carried out and the following results are obtained.

Table of profiles

20 STRs



Markers	Putative father	Offspring
CSF1PO	10-11	10
D1S1656	15-17.3	17.3-19.3
D2S1338	17-19	17-21
D2S441	11-14	11
D3S1358	14-17	17-18
D5S818	11-13	11-12
D7S820	10-11	9-10
D8S1179	9-13	13-15
D10S1248	14	12
D12S391	16-18	16-19.3
D13S317	11-14	11-12
D16S539	11-14	12-14
D18S51	16-22	16-17
D19S433	13-14	14-15
D21S11	31-31.2	30-31
D22S1045	15-16	15-16
FGA	21-23	21-22
PentaD	9	9-12
PentaE	7-8	8-13
TH01	6-7	6-9.3
TPOX	8-10	8
VWA	16-18	15-18

4.1 Approach

After a woman dies her child claims for a paternity test of the man who is supposed to be his father. The test is carried out and the following results are obtained.

4.2 Calculate the paternity index (PI) for every marker (Table 8A). Indicate the hypotheses used.

Notes:

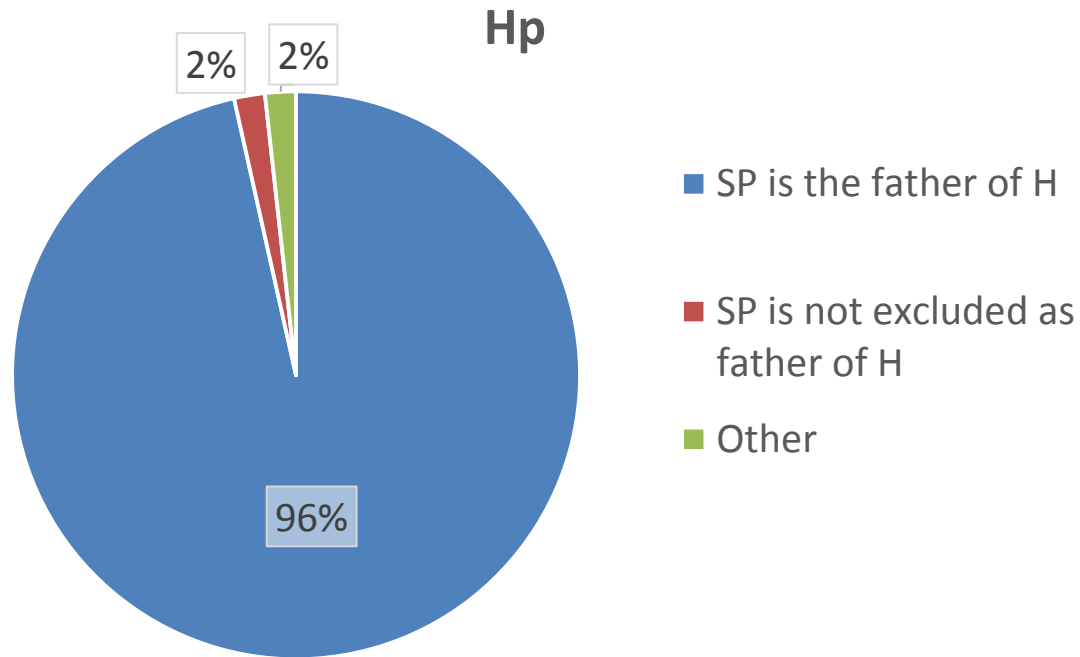
- *Use the allelic frequencies provided corresponding to a genetic database of unrelated residents in the area (2015 Kinship challenge frequencies) . Frequencies are shown only for the alleles possibly involved in the profile.*
- *Silent alleles rate 0.005*
- *Mutation rate 0.001*

Hp	
Hd	

4.2.1. Hypotheses.

Specify the hypotheses used to carry out calculations.

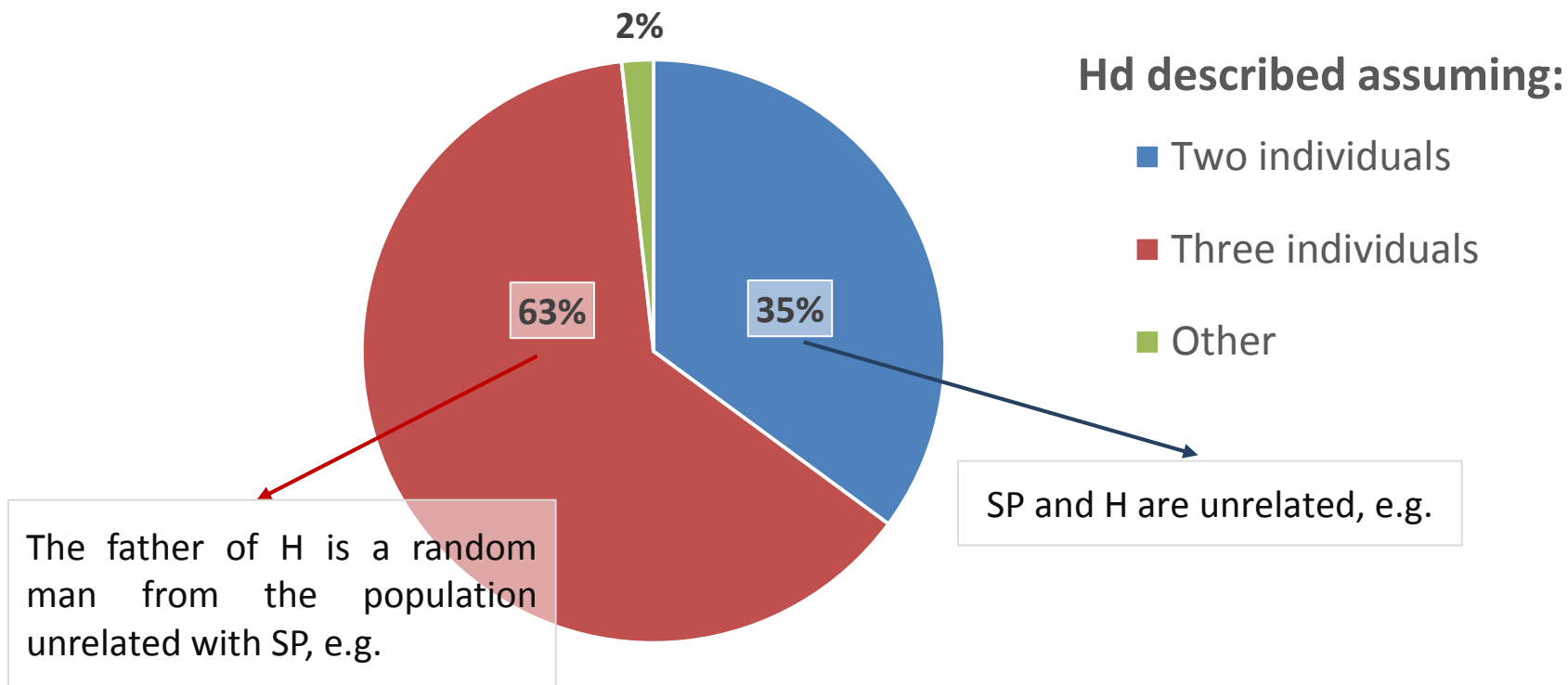
Hp	
Hd	



4.2.1. Hypotheses.

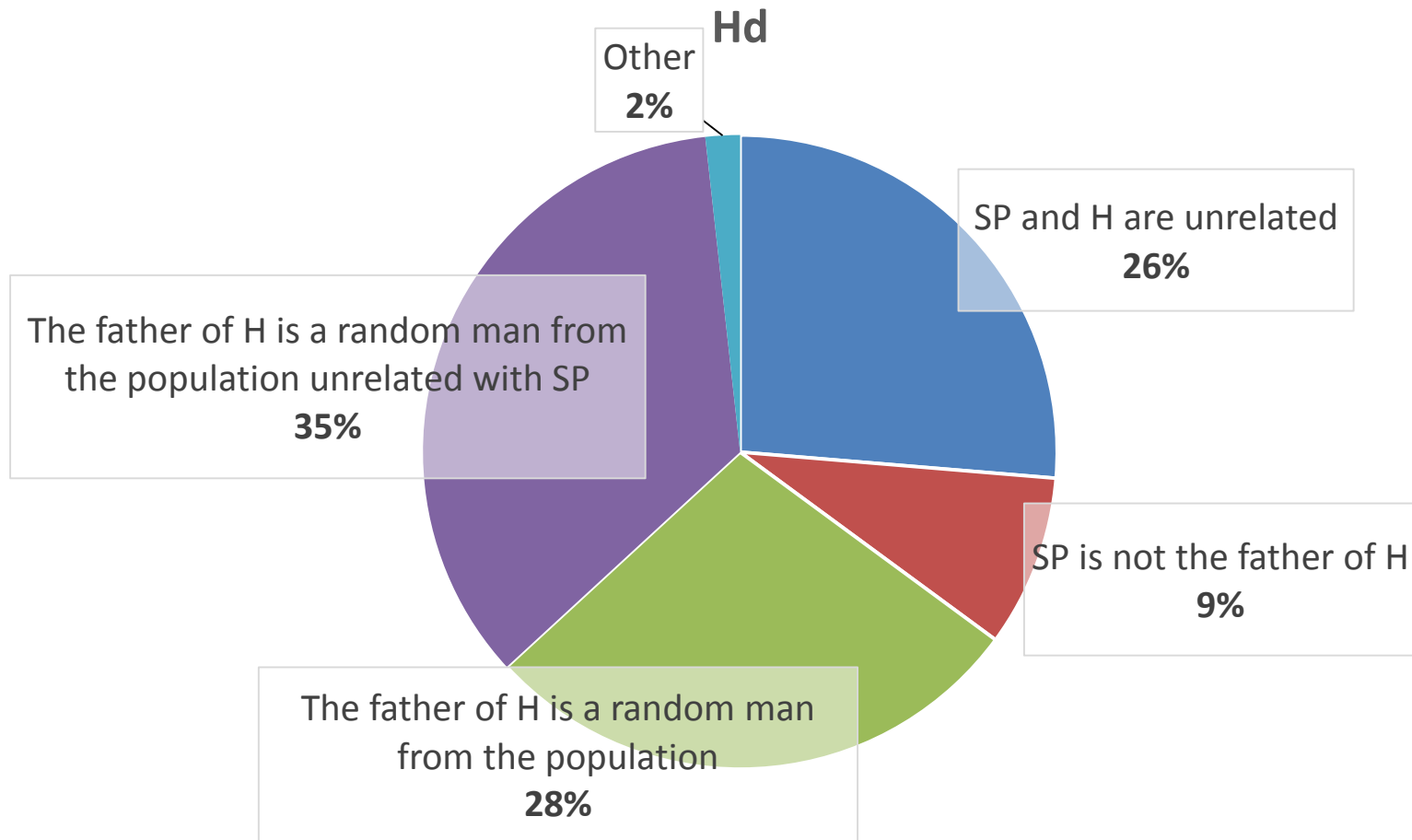
Specify the hypotheses used to carry out calculations.

Hp	
Hd	



4.2.1. Hypotheses.

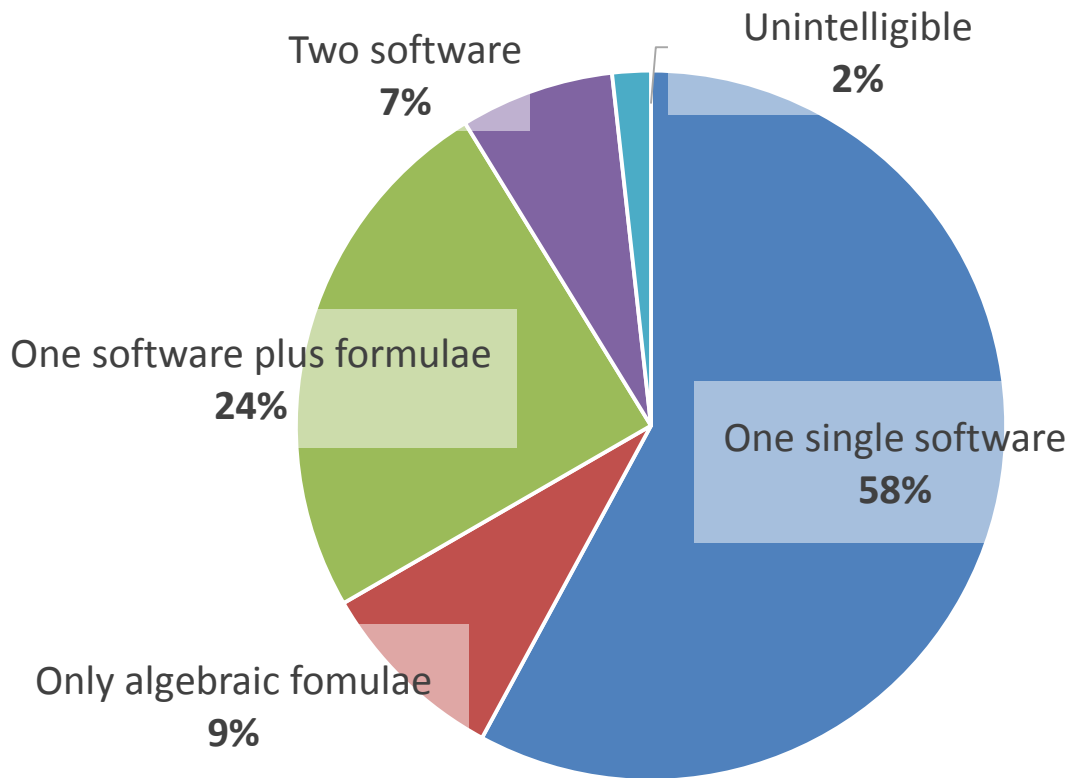
Specify the hypotheses used to carry out calculations.



4.3. Statistical analyses.

Software/s and/or the algebraic formulas, in case of hand-made, used to carry out the statistical calculations.

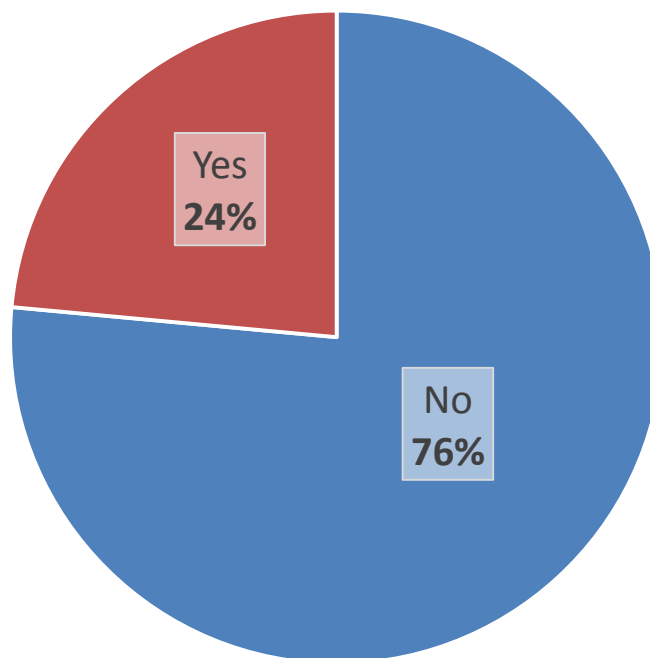
Methodology for statistical treatment



4.3. Statistical analyses.

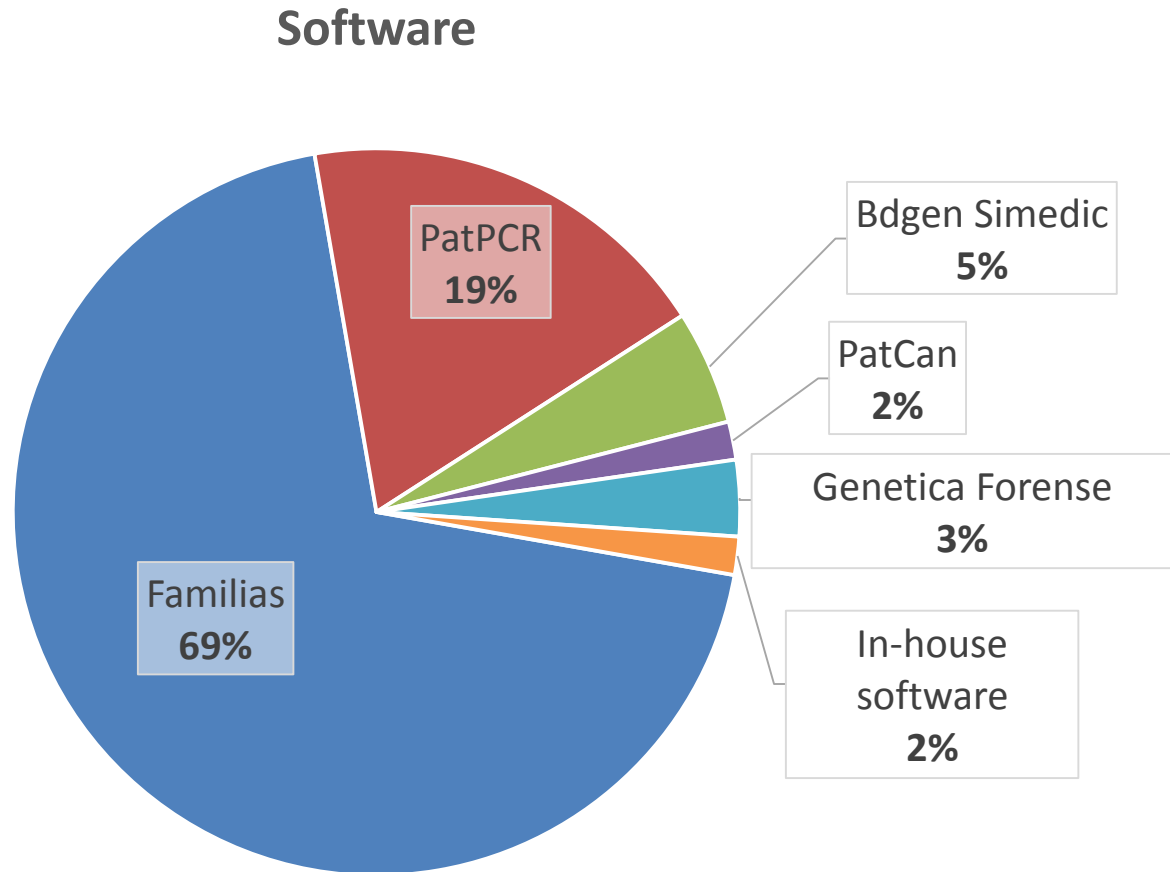
Software/s and/or the algebraic formulas, in case of hand-made, used to carry out the statistical calculations.

**Different methodology for DS10S1248 case?
(Specifically mentioned)**



4.3. Statistical analyses.

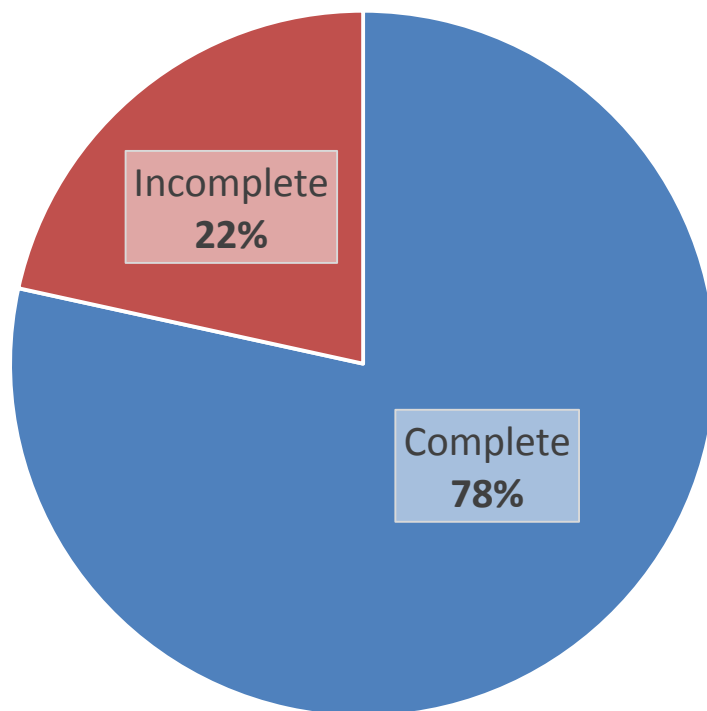
Software/s and/or the algebraic formulas, in case of hand-made, used to carry out the statistical calculations.



4.3. Statistical analyses.

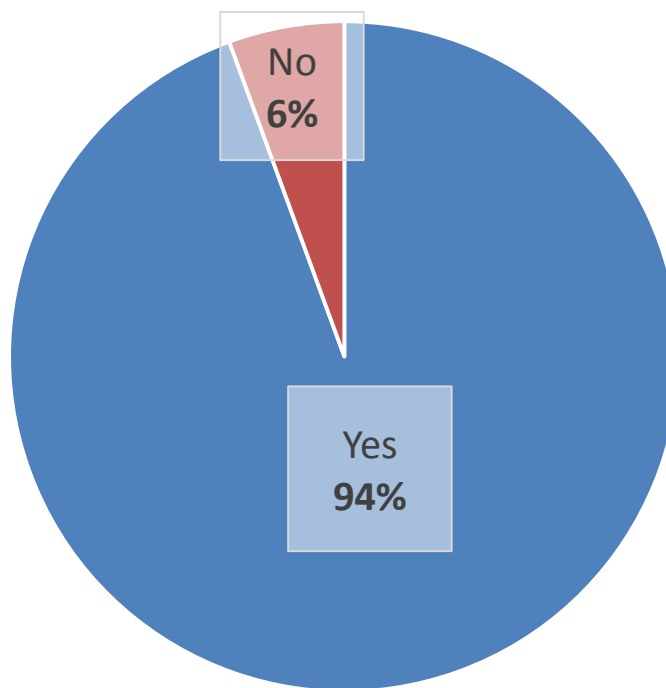
Software/s and/or the algebraic formulas, in case of hand-made, used to carry out the statistical calculations.

Identification of the software

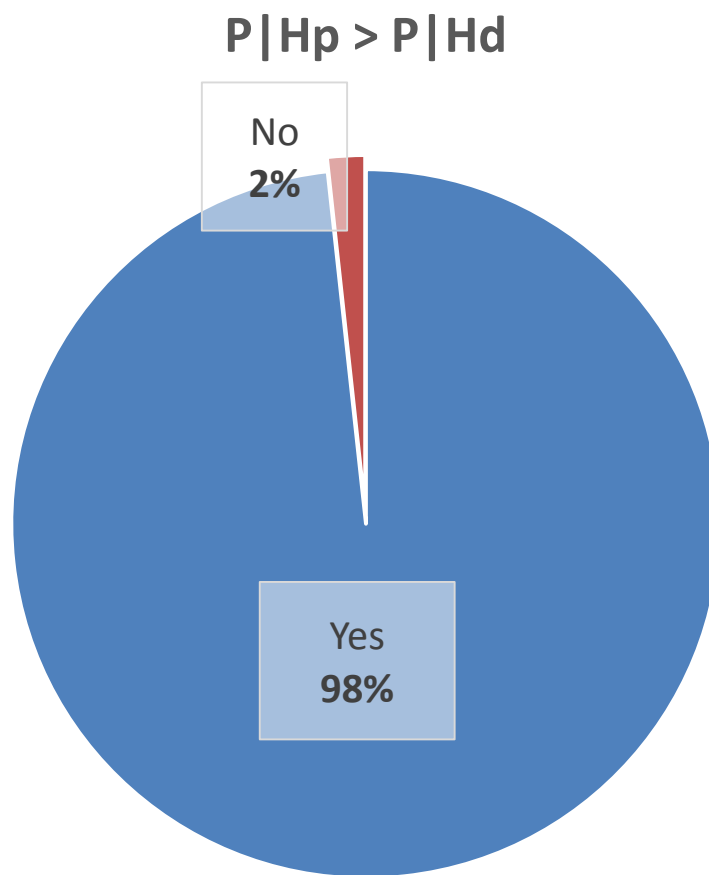


4.2. Statistics.

Numerical results were correctly rounded up?



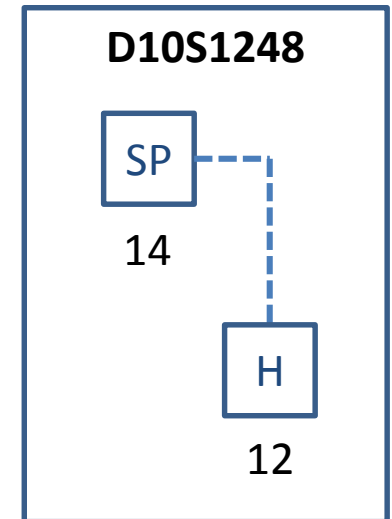
4.2. Statistics.



4.2. Statistics (per marker & 'Total').

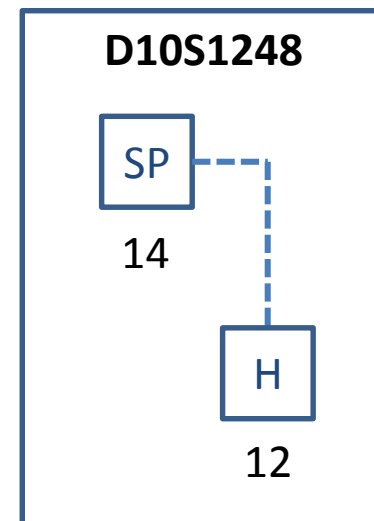
Standard Deviation	Total (21 parameters)	Excluding D10S marker & 'Total' (19 parameters)
Mean	3 181 730	0.2182
Median	0.0958	0.0826
Standard deviation	14 229 018	0.3210

Max value/Min value	Total (21 parameters)	Excluding D10S marker & 'Total' (19 parameters)
Mean	4.29E+10	2.5943
Median	1.8032	1.7750
Standard deviation	1.92E+11	2.0099



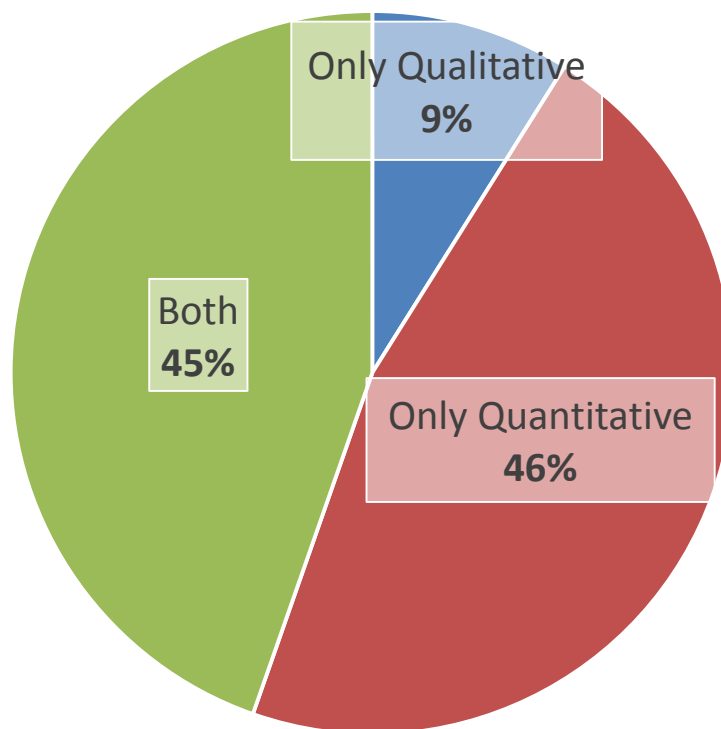
4.2. Statistics (per marker & 'Total').

Statistics	D10S1248	'Total'
Standard deviation	496.47	66 815 831.33
Max value / Min value	3 223 386.279 From E-3 to E+3	9.00207E+11 From E-4 to E+8



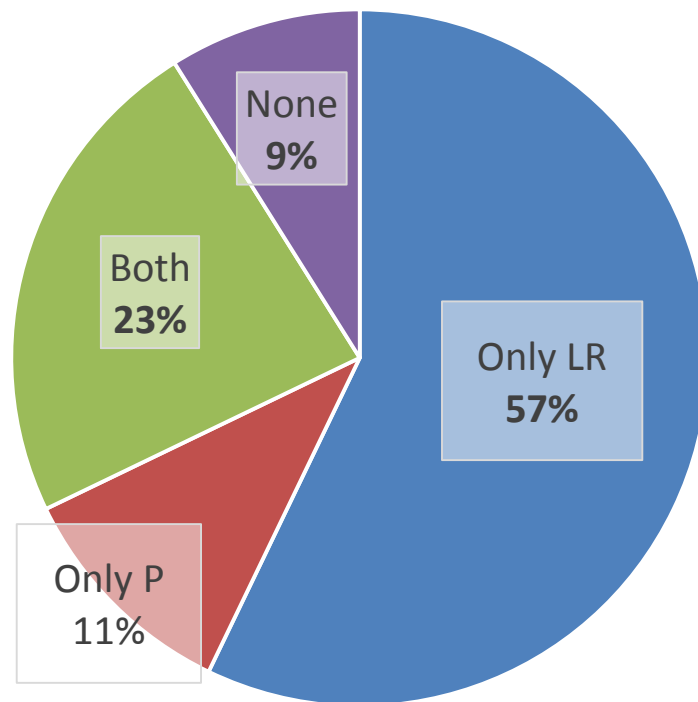
4.4. Conclusions from the statistical calculations.

Conclusions format

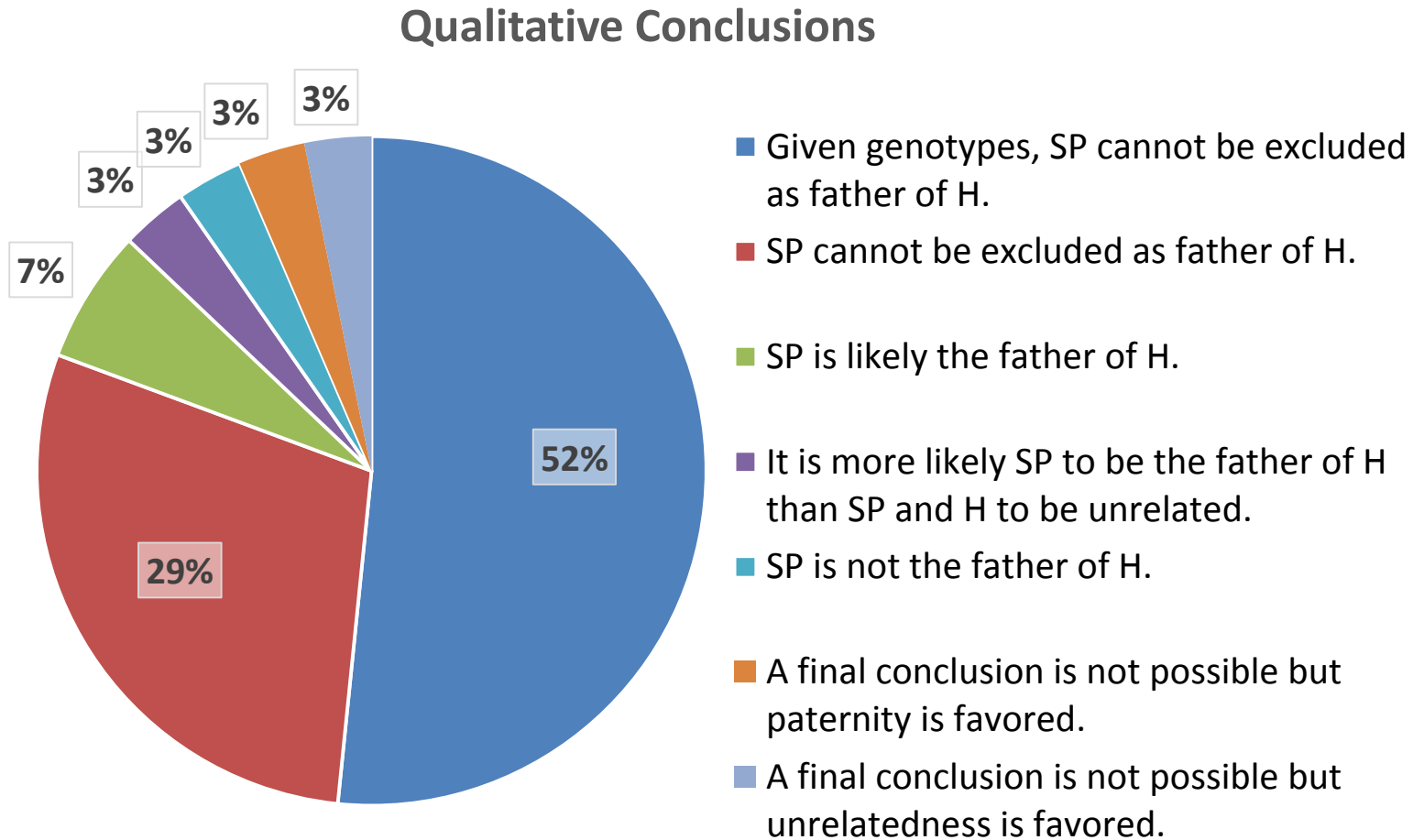


4.4. Conclusions from the statistical calculations.

Quantitative conclusions

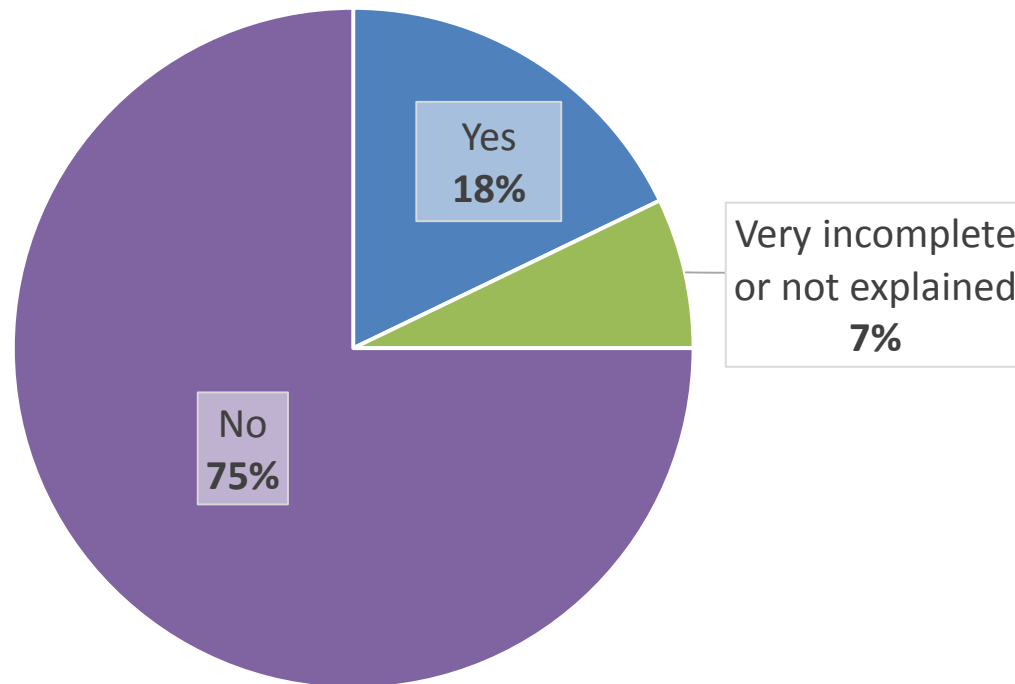


4.4. Conclusions from the statistical calculations.



4.4. Conclusions from the statistical calculations.

Conclusions correctly presented?*



* Most common inaccuracy: Prosecutor's fallacy

- The corresponding report obtained was issued to the court and returned with the information that the man refuses the paternity and claims that the true father is in fact his meanwhile deceased full brother.

(Our) Designed approach	In the exercise* *The bold is ours.
<p>4.5 Indicate the hypotheses considered for a new statistical evaluation.</p>	<p>4.5 Hypotheses (paternity index of the deceased brother) Indicate the hypotheses considered for a new statistical evaluation taking into account this new information.</p>
<p>4.6 Demonstrate the use of your approach, calculating the Likelihood Ratios (LR) for the loci indicated in the table below.</p>	<p>4.6 Paternity index of the deceased brother Calculate the partial paternity index for each marker and the total paternity index, taking into account the last hypotheses proposed.</p>

4.5. Hypotheses.

Hp	
Hd	

(Expected) Hypotheses	Proportion
H0: SP is brother of the real father of H H1: SP and H are unrelated	X
H0: SP is brother of the real father of H H1: SP is father of H (or inverse)	Y
???	Z
?????	W

4.8. Conclusions from the statistical calculations.

Participant mentioned the possibility of, in a real case, presenting two statistics (pat vs. avuncular plus avuncular vs. unrelated, e.g.) instead of just one?	Proportion
Yes.	X
No.	Y

Participant referred the existence of pedigrees belonging to the same kinship class?	Proportion
Yes.	X
No.	Y

4.8. Conclusions from the statistical calculations.

Other Statistics (depending on the defined hypothesis when needed)

Methodology for statistical treatment.

Data dispersion.

Conclusions format.

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