Repetition: Relationship estimation

Thore Egeland

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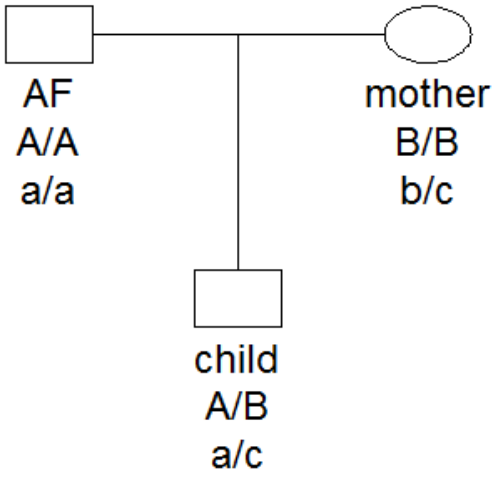
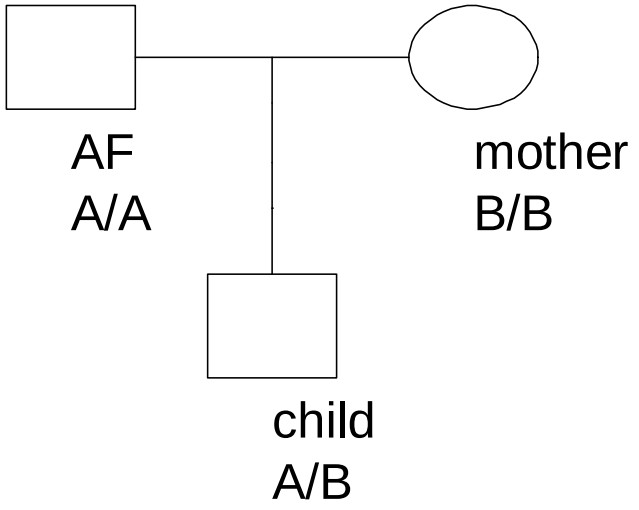
Exercise S1. Standard paternity case

- H_1: The alleged father (AF) is the real father
- H_2: AF and the child are unrelated.

Figure1. Standard paternity case.



Standard paternity

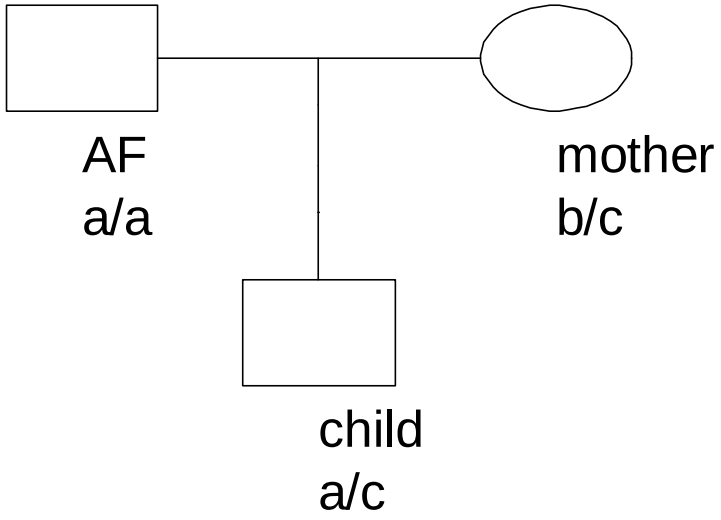


$$LR = \frac{\text{probability of data } \textit{given } AF \text{ father}}{\text{probability of data } \textit{given } AF \text{ unrelated}}$$

$$= \frac{P(child \mid mother, AF)}{P(child \mid mother)} = \frac{1}{p_A} = \frac{1}{0.05} = 20.$$

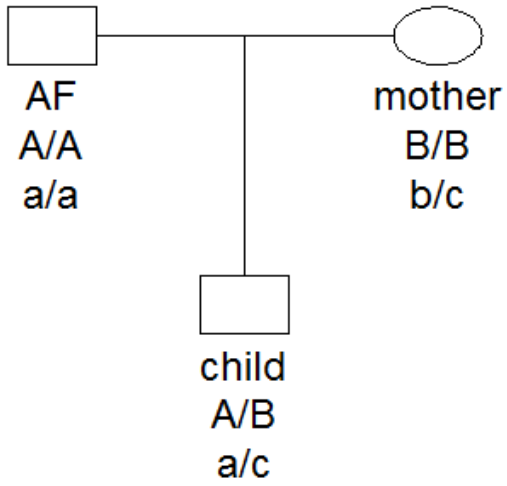
- Interpretation: The data is 20 times more likely assuming AF to be the father compared to the alternative that some unknown man is the father.

Standard paternity c



$$LR = \frac{P(child \mid mother, AF)}{P(child \mid mother)} = \frac{0.5}{0.5\,p_a} = \frac{0.5}{0.5 * 0.1} = 10.$$

Figure1. Standard paternity case.



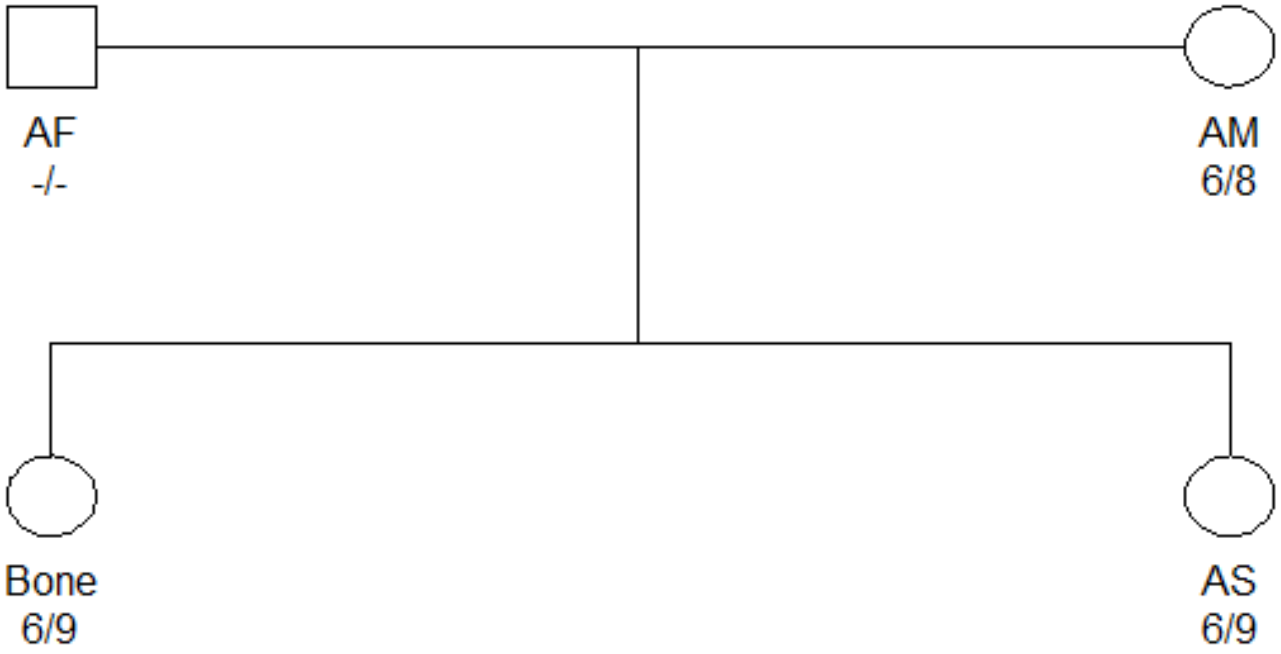
$$LR = 20*10 = 200.$$

• Interpretation: The data is 200 times more likely assuming AF to be the father compared to the alternative that some unknown man is the father".

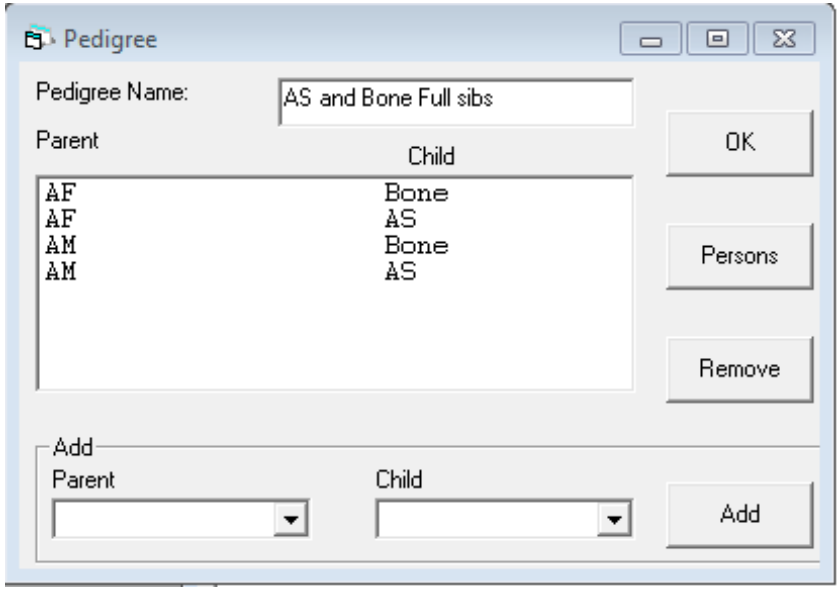
Exercise S3 Cap paper challenge ("bone")

- H_1: The individual providing the bone is the daughter of AM and sister of AS.
- H_2: The individual providing the bone is not related to the tested individuals (AM,AS) of Figure 3

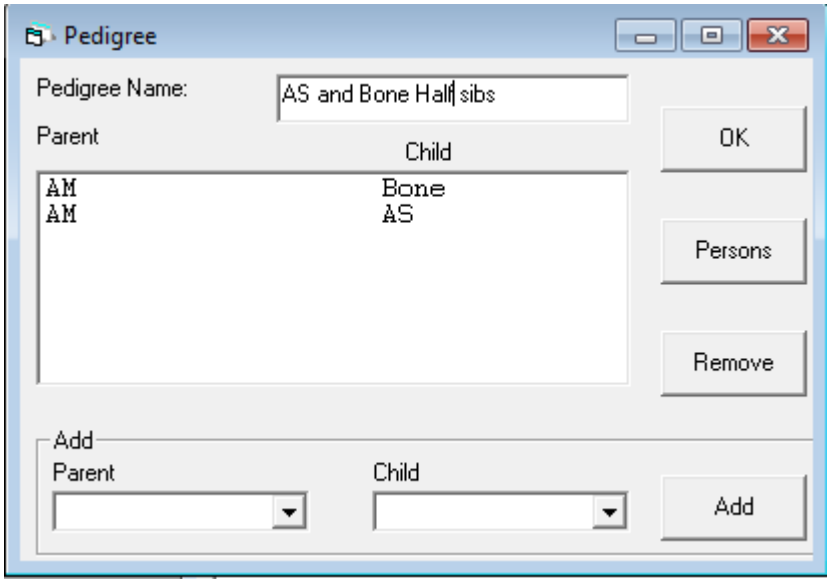
Figure 3. CAP paper challenge. Marker F13B. Frequencies: 6:0.086, 8:0.152, 9:0.328, rest:0.434



Full sibs



Half sibs



The father AF is not typed but included in the full sibs alternative to the left to define Bone and AS to be full sisters.

Complications

- Non-standard cases.
  - Complications:
    1. Complex pedigrees
    2. Theta-correction
    3. Mutations
    4. Silent alleles
    5. Drop-out