"You're Just Not My Phenotype"

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How do you read a paternity blood test report?

What are the differences among: the Paternity Index, the Prior Probability of Paternity, and the Posterior Probability of Paternity?

Hypothetical: the paternity suit against Al, your client, alleges that he fathered Katie with Martha. You have just received the genetics laboratory's DNA blood test report. The report indicates that Al's "Paternity Index" is 113 and that his "Probability of Paternity (presuming a 50% Prior Probability of Paternity)" is 99.1%.

What the heck does all that mean?

Family Code section 7555 creates a rebuttable presumption of paternity, affecting the burden of proof, if the defendant's Paternity Index is 100 or greater.

So there is a rebuttal presumption that Al is Katie's father.[1]

The two types of evidence in a paternity case are: Genetic Evidence (the blood test) and Non-Genetic Evidence (Martha's sexual activity during conception).

Al's 113 Paternity Index means that Al is 113 times more likely than the random male to be Katie's father. Paternity Index is based solely on Genetic Evidence.

Prior Probability of Paternity, on the other hand, is based solely on Non-Genetic Evidence. In fact, Prior Probability of Paternity is simply Non-Genetic Evidence (Martha's sexual activity during conception) expressed as a percentage.

Al's 99.1% Posterior Probability of Paternity (sometimes referred to simply as his "Probability of Paternity") is the overall probability that Al is Katie's father after consideration of both Genetic Evidence and Non-Genetic Evidence. It is called the "Posterior" Probability of Paternity because it is determined "after" consideration of both Genetic and Non-Genetic Evidence.

Thus, the three blood test concepts are determined by these three types of evidence:

Blood Test Concept:	**Determined By:**
Paternity Index	Genetic Evidence Only
Prior Probability of Paternity	Non-Genetic Evidence Only
Posterior Probability of Paternity (sometimes referred to simply as the "Probability of Paternity")	Both Genetic and Non-Genetic Evidence

Genetic Evidence is scientific. Nevertheless, Non-Genetic Evidence can control Genetic Evidence. Two obvious examples:

1. If Al had no sexual relations with Martha during conception (Prior Probability of Paternity = 0%), Al is not Katie's father, no matter how high his Paternity Index happens to be.
2. If, on the other hand, Al is the only male who had sexual relations with Martha during conception (Prior Probability of Paternity = 100%), Al is Katie's father no matter how low his Paternity Index happens to be.

The problem with Non-Genetic Evidence, of course, is that it depends on those pesky, lying humans.

When a blood test presumes a 50% Prior Probability of Paternity, it presumes that Al and one other male ("Bruce") had intercourse with Martha during conception.

We know from Al's 113 Paternity Index that Al is 113 times more likely than the random male to be Katie's father. Unless and until Bruce's phenotypes are tested, Bruce is the random male. Therefore, if Al and Bruce each had intercourse with Martha during conception (Prior Probability of Paternity = 50%), Al's Posterior Probability of Paternity is 113/114, or 99.1%. The fraction's numerator is Al alone (113) and its denominator is Al plus Bruce (113 + 1 = 114).

If, on the other hand, Martha had relations with Al, Bruce, Charlie and David during conception, Al has a Prior Probability of Paternity of 25% and a Posterior Probability of Paternity of 113/116, or 97.4%. The fraction's numerator is Al alone (113) and its denominator is Al plus Bruce plus Charlie plus David (113 + 1 + 1 + 1 = 116).

So, how do you defend Al? First, you find out about Bruce, Charlie and David. That takes some action. Then you make the big decision: you either ask the trial court to order the three non party men to submit to blood tests (Fam. Code S7551), or you don't.

If Bruce, Charlie and David are blood tested and are genetically excluded as Katie's father, Al loses his case.

Let's say that you're not willing to risk the exclusions of new "suspects," so you decide to go to trial without testing them. What kind of shape is your case in now? You can argue that Non-Genetic Evidence has now established a Posterior Probability of Paternity for Al of only 97.4%, as opposed to 99.1%. Big deal. (Of course, prior to trial Martha's lawyer might well decide to pay the genetics laboratory the additional fee for the two extra phenotype probes which will, in all likelihood, increase Al's Paternity Index to around 10,000, thereby bringing his Posterior Probability of Paternity back up darn close to 100%.)

In summary, how does Al's case look after your brilliant investigation has discovered three more possible fathers for Katie? The statutory presumption of paternity still applies to Al, but now you can argue (at best) that Al's Posterior Probability of Paternity has plummeted from 99.1% all the way down to 97.4%. And what's the probable result?

Happy Father's Day, Al!

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Endnotes

1. Your first reaction is, "Hey, that's not too bad. Al's Paternity Index is only 13 points above the presumption level." You then discover that the genetics laboratory, following its standard practice, stopped testing the blood samples once Al's Paternity Index exceeded 100. For an additional fee, the lab will run two additional phenotype probes on the blood samples. There is a slight possibility that new probes will exclude Al as Katie's father, which would be terrific for your case. It is far more likely, however, that the new probes will increase Al's Paternity Index to somewhere around 10,000. That's not so helpful.