F12 Probabilistic Genotyping in the Courtroom: Admissibility, Families, Secondary Transfer, and Competing Statistics

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Learning Overview: The goal of this presentation is to convey the difference between different statistics, specifically Random Match Probabilities (RMPs) and likelihood ratios for the purpose of expert witness testimony, the importance and nuances of admissibility hearings for probabilistic genotyping, and the use of the familial diagnostic in casework and the courtroom.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating how probabilistic genotyping is changing the way the forensic DNA expert testifies in the courtroom, as well as the way counsel presents their case. It is important for attorneys and scientists to be provided with the background information on applications and limitations of expert witness testimony on probabilistic genotyping.

STRmix™ went live for casework in the first United States laboratory in 2014. Since 2014, more than 40 additional laboratories have also gone live for casework with many additional United States laboratories in various stages of validation and implementation.[1] This presentation will discuss the differences between the RMP versus the Likelihood Ratio (LR) and how transitioning to LRs changes the way DNA evidence must be offered in court. The initial difficulties facing forensic DNA experts and attorneys working in the United States court system were primarily regarding admissibility and how to explain this new technology to a jury. The admissibility of probabilistic genotyping in the courtroom is currently making its way throughout all levels of the legal system. A discussion on filing motions *in limine*, in addition to responses to these motions, from jurisdictions with and without previous admissibility rulings will be addressed.

Nearly five years later, new challenges are emerging regarding testimony on probabilistic genotyping. What is the difference between different probabilistic systems? Is this case covered by this past admissibility hearing? What information can be garnered from these types of analyses other than a statistic? Can this analysis provide any support for or against a secondary transfer argument? What does this mean for relatives of the victim and/or person of interest? The familial diagnostic has been employed at DNA Labs International (DLI). This tool is utilized by DNA analysts to help evaluate probabilistic genotyping results and determine when reference standards from primary relatives may be requested. The effects of the use of this diagnostic in the courtroom will be examined.

Probabilistic genotyping has evolved how forensic DNA evidence is presented to the jury from the forensic DNA expert and the attorneys. Training, care, and consideration must be applied for the prosecution and defense attorneys and the respective DNA experts. There are probative applications to this testimony as well as limitations. As always, it is important to not overstate or understate the evidence at hand. Professional responsibility on presenting probabilistic genotyping evidence is paramount with the implementation of any new technology.

Reference(s):
[1] *Labs Live.* STRMIX, accessed July 31, 2019, https://johnbuckleton.files.wordpress.com/2019/07/labs-live.pdf.

Probabilistic Genotyping, Likelihood Ratio, Expert Testimony

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