

A TALE OF TWO DATABASES: A COMPARISON OF THE APPLIED BIOSYSTEMS YFILER HAPLOTYPE AND U.S. Y-STR DATABASES

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Evidence samples involving mixtures of biological material from female and male contributors are routinely encountered in Forensic Laboratories. Many of these “mixed” evidence samples are comprised of limited amounts of male DNA; therefore, male specific Y-STR analysis is often conducted in Forensic DNA Testing laboratories. In order to give weight to Y-STR inclusions, the counting method is employed to obtain an observed frequency of the Y-STR profile in a haplotype database, and an upper bound 95% confidence interval is applied to generate an estimated frequency of the haplotype in the U.S. population. The number of haplotypes used in a database search will impact the estimated frequency for a haplotype in a given population group; therefore, the counting method is limited by the size of the haplotype database used. The United States Army Criminal Investigation Laboratory (USACIL) assessed the Applied Biosystems Yfiler Haplotype Database and the U.S. Y-STR Database by conducting multiple searches of full and partial haplotypes within each database. This study resulted in a switch to the U.S. Y-STR database for haplotype frequency estimation for reasons including the U.S. Y-STR database size, ease of use, and the statistical approach used in haplotype frequency estimation. The USACIL also evaluated the Y-Chromosome Haplotype Reference Database, but determined it was better suited for research applications rather than day to day forensic casework operations.

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