

## **GUIDELINES FOR RECORDING, INTERPRETING AND REPORTING COMPLEX STR MIXTURES**

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Analysis of forensic specimens submitted for DNA profiling is routinely performed in laboratories throughout the world using commercially marketed multiplex Short Tandem Repeat (STR) systems. This technology has been available for several years and forensic scientists are becoming increasingly experienced with interpreting the results of such analyses. However, the nature of forensic samples is such that analysts are frequently presented with challenges when attempting to correctly interpret STR profiles, particularly when the results indicate a mixture of DNA from two or more individuals. Substrate contamination and degradation of the DNA merit additional consideration.

Biologists at the Centre of Forensic Sciences (CFS) analyze over 8000 STR profiles generated from crime-related samples per year and have offered an STR service since 1994. Using this considerable casework experience, accompanied with empirical data derived from our own validation studies, we have developed guidelines for recording, interpreting and reporting the results of multiplex STR analysis.

With reference to DNA mixtures of increasing complexity this poster illustrates our approach to recording observed genotypes and demonstrates how we ensure consistency of interpretation among our 20+ reporting scientists. Influenced in part by stringent criteria for uploading profiles to the Canadian National DNA Databank Crime Scene Index we show how interpretation of the DNA mixture utilizes the entire data available from the analysis process, including peak height concordance, amount of template DNA and ratios of DNA in the amplified product. Examples are given of complex mixtures of DNA from three or more individual components and those where exclusion probabilities should not be applied. Also demonstrated is a simple Excel-based program, developed in-house, which greatly improves our efficiency of determining the RMP. Finally, some exemplar reporting statements are included which have been developed through consultations with other major forensic science laboratories in Canada.

In our experience this approach not only greatly facilitates training of new scientists and technical review of casework STR results but also ensures that we continue to support our client groups in the law enforcement and legal communities by reporting conclusions clearly and with consistency. Our methods are simple to understand, have withstood legal and peer challenge and serve as an excellent resource for laboratory personnel who may be considering developing guidelines of their own.