A PUBLIC AND PRIVATE SECTOR PARTNERSHIP FOR USING THE PROMEGA POWERPLEX™ CODIS STR MEGAPLEXES IN FORENSIC CASEWORK, CONVICTED FELON DATABANKING AND NO-SUSPECT CASEWORK SCREENING

George R. Riley [1] Ph.D., Piper L. Schwenke[1], B.S., Amy L. Palm[1], B.A., Katie Lindberg[1], B.S., Jennifer L. Iem[1], M.S., Anne G. Pace[1], B.S., Todd Bille[2], M.S., Paul Misner[2],B.S., Eric L. Lawrence[2], Howard C. Coleman[1], B.S., B.A., and Teresa H. Aulinskas[1], Ph.D.

[1]*GeneLex Corporation, Seattle WA*
[2]*Indiana State Patrol, Indianapolis IN*

Starting in 1997, the Indiana State Patrol and GeneLex Corporation validated and implemented the core CODIS STR loci (PowerPlex™ 1.1 in 1997, PowerPlex™ 2.1 in 1999) for use in forensic casework, convicted felon databanking, and no-suspect case screening. While their implementation must meet comparable ASCLD/LAB requirements, the actual testing requirements are markedly different in each of these applications. When all three systems are used together they address backlogs in both CODIS databank samples and no-suspect cases. When implemented as a partnership between the public and private sectors cost-effectiveness can be optimized.

Implementation of the thirteen CODIS core loci for forensic casework, preceded by implementation of convicted felon testing, followed the standard model of TWGDAM validation, training, competency, and proficiency testing, followed by actual casework. Implementation of these STR megaplexes achieves the goal of achieving a discriminatory power comparable to that of RFLP with all the attendant benefits of increased sensitivity, speed and robustness that come with PCR testing. We have incrementally improved the efficiency of the application of this testing to casework by implementing improved extraction methods and a team approach to casework. The process of forensic casework remains labor intensive due to the intrinsic nature of the work.

Convicted felon data banking requires a paradigm shift in procedural approach when compared to forensic casework. Every aspect of the convicted felon testing was carefully analyzed to maximize the efficiency of the record keeping, bench work, and data management. The result is a high throughput testing system that takes maximum advantage of personnel and equipment and has a routine capacity in excess of 6500 tests per year per analyst.

No-suspect casework screening procedures take advantage of the testing efficiencies developed and implemented in high throughput convicted felon testing. To do this we carefully analyzed forensic casework processing and analysis procedures evidence in light of the experience gained during implementaion of the high-throughput system. Each of the steps from extraction through analysis and reporting has been streamlined to reduce both the amount of processing time and the amount of paperwork required. A portion of the best item of evidence from each case is selected and then batch processed. Simplified reports are generated for each case and the data compared to the CODIS database. Once a suspect is developed, the rest of the case is analyzed, with the original evidence, using routine casework procedures. The result is the ability to rapidly process large numbers of no-suspect cases for comparison to CODIS and NDIS databases.

The three interlocking DNA analysis systems maximize the advantage of having an up to date CODIS databank. These systems make the best use of funds and personnel by reducing the backlog of un-worked no-suspect cases and providing a mechanism for rapid analysis of new no-suspect cases. They increase a DNA analysis laboratory's ability to provide reliable, timely and economical data to the justice system.