A COMPREHENSIVE SAMPLE BARCODING PROGRAM TO AUTOMATE WITNESS STEPS FOR FORENSIC DNA CASEWORK

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Ensuring accurate sample labeling is critical in all laboratories. A fail-safe method is required to reduce opportunities for a sample switch during tube transfer steps. Many laboratories use a witness for tube transfers, a second analyst who verifies the first analyst's labeling and transfer activities, as a guard against error. Unfortunately, manual verifications are time-consuming, disruptive to work flow, and may not prevent all errors. Some laboratories automate DNA processing using liquid handling robots to reduce the number of manual sample transfers. Since no single robot can conduct the entire DNA testing process, manual tube changes must still be verified.

The HCIFS Forensic Biology Laboratory has developed a comprehensive software system that utilizes barcodes and a SQL database to track samples throughout processing. Whether manual or robotic, the system reduces the number of 2nd-analyst verifications from approximately twenty to one. The verifications are not eliminated but are done without a second analyst. Robots alone, without barcoding, require approximately 10 manual verifications.

A 1D and a 2D barcode is made for each sample prepared for DNA testing. Barcode scanners at each workstation or scanners installed in the robot liquid handlers are used to track and confirm samples from that point forward. At each step requiring the transfer of material from one tube to another, the analyst scans barcodes on the original and destination tubes and the software confirms the labels match. The system ensures that the same label cannot be scanned twice to bypass the verification.

The system also directs the order of testing samples according to their priority and tracks the samples through the process to their final storage location. A full description of the system will be presented.