THE RELEASE OF OSIRIS PUBLIC DOMAIN SOFTWARE FOR DNA PROFILE QA

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Searches of DNA profile databases are embraced by criminal justice systems across the world as a reliable and efficacious way to solve crimes, but the approach continues to be a victim of its own success. Within the US, laws governing collectable offenses have expanded to include all felonies in all states, some misdemeanors in some states and arrestee testing in several states. This foreshadows higher testing demands as these trends spread across the country. Print and internet media attention frequently focus on a swelling Offender/Arrestee backlog following generous infusions of federal, state and local backlog reduction funding.

The rapid growth of offender databases over the past 8 years has not been fast enough to prevent looming backlogs, leaving forensic laboratories struggling for ways to bridge the gap between sample analyses and profile uploads. Given the high volume and high throughput environment these samples face, quality assurance is critical. Poor quality data slow the review process. DNA profile review remains the critical bottleneck to overcoming backlogs.

The Open Source Independent Review and Interpretation System (OSIRIS) software facilitates rapid review and quality assessment of STR profiles using an independently derived set of algorithms (Goor et al, 2009, in prep.) that are robust indicators of multiplex DNA profile quality. Based on laboratory-specified protocols that set limits for various quality metrics, OSIRIS open-source C++ code encourages customized applications for integration into a laboratory's work-flow. OSIRIS processes typical .fsa files in less than 0.25 seconds on standard Mac or Windows computers. It has unattended batch processing capability and has been challenged by the 700 NIST population samples for concordance studies for both AB and Promega manufactured reagent kits. OSIRIS development also relied on thousands of samples representing all commonly used reagent kits and analytical platforms through State and local laboratory collaborations.

We demonstrate OSIRIS' stand-alone functionality, review its concordance studies and collaborations, report on the integration of OSIRIS analyses with AFDIL's LISA system, and suggest some novel uses for the new measurement characteristics OSIRIS generates that may improve analysts' performance and predict problems in analytical platform equipment.

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