

A FOCUSED STUDY ON ONE MAJOR BENEFIT OF EXPERT SYSTEM IMPLEMENTATION: THE TIME SAVINGS

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Forensic laboratories worldwide have made great advances in forensic DNA testing: technology, chemistry, techniques, instrumentation, robotics, and software. One of the latest advances for high throughput DNA processing is the use of expert systems for the analysis of single source samples. With the adoption of multi-capillary instruments, single amplification kits, and robotics along with the expansion of laws for the collection of convicted offender samples, the bottleneck in sample processing has shifted from laboratory work to the time-consuming technical review of offender sample data. Current laboratory practice without a validated expert system requires two forensic analysts to visually review the data before a DNA profile is entered into the national database. During the review process, analysts must apply a written set of standard operating procedures, which may have many rules and can be difficult to apply consistently.

Expert systems promise to significantly speed the data review process. They apply complex algorithms, automate data analysis, and free analysts to focus on other tasks. The NIJ Expert Systems Testbed (NEST) Project evaluated the ability of three commercially available expert systems—designed specifically for forensic DNA laboratories—to rapidly and accurately review convicted offender single-source DNA samples for the eventual upload into the national DNA database. We evaluated many steps involved from buying the programs to running them. One step not previously reported on is the processing speed and time-savings associated with each computer program.

This study focuses on the time savings using those expert systems previously evaluated by the NEST Project Team. It includes timed comparisons between scientists and software to process defined datasets. The procedure for using the expert systems was broken down into multiple steps. We timed several analysts who are very familiar with the software systems in performing each of these steps. Some of the steps evaluated were: 1) the time required to import data; 2) the time to setup the data for analysis; 3) the time to process the dataset by the software; 4) the time to analyze the controls; 5) the time to generate the files for eventual upload into NDIS; and, 6) the time to review all flags and rule firings. These times were compared to the overall time it takes for two scientists to manually review the data as the standards require. In summary, using an expert system greatly reduces the analysts' time spent reviewing data. The authors of this poster found that the three programs will help reduce the DNA convicted offender backlog and ensure timely and accurate submission of the data into the national database. Additionally, three laboratories will present the time-savings and overall changes in their workflows by having a validated expert systems in active use.

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