The Development of Forensic Sample Management Systems to Address Data Management Bottlenecks

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Since 2005, the National DNA Index System (NDIS) has doubled in size and now holds greater than five million convicted offender samples. The California Bureau of Forensic Services Laboratory, which represents the single largest state database within the country, recently surpassed 1 million convicted offender profiles. With the expansion to all felon arrestee DNA collection through Proposition 69 to take affect in January 2009, it is estimated that 30,000 – 40,000 new profiles will be uploaded each month in California alone. A majority of other states have proposed or enacted similar legislation such that the national database will continue to grow at a rapid pace.

Concurrently, many crime laboratories have increased capacity through implementation of robotic equipment and are processing an increased number of forensic cases, including property crimes and other less violent crimes. Predictably, the combination of events has contributed to a corresponding increase in Cold Hits. For example, the implementation of a property crimes DNA program in 2008 by the San Francisco Police Department (SFPD) has resulted in a Cold Hit rate of >80% and sexual assaults are also being solved at a rate of >50%. This new caseload strains not only state and local crime laboratories but the entire legal system.

Improvements in forensic DNA such as database expansion, sample automation, and new technologies will only be fully realized when a model forensic case management system accommodates data migration and other common bottlenecks. The Sample Management Systems described in this presentation offers a solution to this developing problem.

Bode Technology's Sample Information Management System (Bode-SIMS) is designed to track samples from sample set-up, through processing and report generation. Bode-SIMS has many built-in features to assist in standardizing processes, and integration with robots for automation of processing, sample analysis, and management of samples leading to enhanced quality control and efficiency of forensic DNA sample processing.

Bode-SIMS is an inexpensive tool that uses two easy-to-use workbooks that are designed to manage the processing of DNA samples in your laboratory. It provides:

- **Data Transcription:** Sample information is entered only once into the system and the data is transcribed as needed, eliminating potential errors in data entry.
- **Process Automation:** Improve process workflow by exporting and importing data to instruments used in automation.
- **Customization:** Bode SIMS can be customized for each user's process. This includes managing process workflow, equipment specification, sample evaluation, and results reporting.
- **Process Standardization:** Provides warning messages if data is missing or incorrect from a previous step
- **Simplification:** Data review and reporting by using your interpretation guidelines to categorize results for data review
- **Quality Control:** Sample information is verified with controls and preset values

Sample Management Workbook

Bode-SIMS manages your samples through the use of two workbooks. The Sample Management Workbook manages the processing of samples from DNA extraction though PCR amplification and preparation of CE analysis. The Sample Processing Workbook provides the following features:

- Automated worksheet generation for case folders in 96 Well tray layout
- Integration of reagent lot number and instrumentation recordkeeping

- Application of user-specified conditions to flag samples with low quant values
- Flexibility to make changes by analyst (no need for a separate IT team)
- Customized integration with your robotics and instrumentation platforms

Data Management Workbook

The Data Management Workbook is designed to manage the data imported from CE analysis to the generation of data used in report s or uploaded into a database. The Data Management Workbook provides the following features:

- Import tables generated by either GMID or Genotyper
- Display table in easy to read vertical format
- Apply automated formatting rules (i.e. below threshold, imbalanced alleles)
- Verify accuracy of allele calls for all controls
- Generate CMF v3 XML file after analyst's review and/or modification for uploading to CODIS