B1 The Application of Laboratory Information Management System (LIMS) in Forensic DNA Database Laboratory

Hong-teng Tsui, MPhil*, and Kwong-yuk To, PhD, Forensic Science Division, Hong Kong Government Laboratory, Ho Man Tin Government Offices, 88 Chung Hau Street, Kowloon, Hong Kong, China

After attending this presentation, attendees will appreciate DNA technology and forensic biological science.

This presentation will impact the forensic community and/or humanity by sharing experience in automation using a computer system called LIMS in forensic laboratories. The system can handle case related information with database and user interface. The goal is to enhance the efficiency of forensic services and to reduce potential human errors.

Forensic DNA database laboratories have to handle a large amount of reference control samples, such as buccal swabs or blood stain cards for DNA profiling and database application. The DNA results are then compared or searched against crime scene exhibits for forensic investigation. There is a large amount of case related information which has to be recorded and browsed, for example, police related references and offence details. Moreover, technical worksheets or documentation are required to be generated during technical and analytical procedures in accordance with international crime laboratory standards, like ASCLD/LAB. Finally, the expert witness statements also require case information to be included for presentation to the court. The handling of these data and records requires much human resources and is timely to process; case related files with examination and administrative pages also occupy significant amount of physical storage space. As a result, a solution is needed to handle such amount of case related data.

In order to streamline the process and reduce human involvement, a LIMS computer software was designed and tested to automate case infor- mation management process in the laboratory. The LIMS software tested was StarLIMS™ and the database software was Oracle™.

The system in the laboratory is basically divided into 5 main parts: 1. data entry at the reception counter; 2. chain of custody records; 3. auto- mated worksheets and statement generation; 4) file export and import for instrument and CODIS communication; 5. statistical report generation.

1. Clerical staff at the reception counter input case related information into the database through the LIMS interface which is connected to a bar code system that facilitates the input process. Moreover, the interface has pre-stored data, such as police stations for selection during input, in order to reduce the typing workload.

2. The chain of custody interface records the transfer of exhibits from delivering to receiving officers.

3. The LIMS system is able to generate technical worksheets and tem- plates for witness statements. It will access the case related data stored in the database and fill-in that data to the templates automatically.

4. The communication between CODIS and instruments to LIMS can be achieved through export and import files that are in either "txt" or "csv" formats. In the application, the LIMS can "capture" the DNA profiles exported by Genotyper™ software, and store it in the database for CODIS import and statement template generation.

5. The system is able to calculate monthly or yearly statistics reports, including total case submitted from police and total case completed within the committed targets. Moreover, the output capacity for each professional staff can also be provided. This is very important for material purchasing and resources allocation in future planning.

In conclusion, the database for LIMS stores all necessary case related information, which can be accessed through workstations in the laboratory. It is protected by RAID and tape backup. The LIMS interface accesses and updates the database; it also generate different worksheets, expert witness statement's templates, export files for instruments and CODIS entry, as well as import result files from various instruments to update itself. The efficiency of a laboratory can be enhanced by such computer aided case information handling system especially for forensic laboratories which handles a large amount of case information. It can also increase accuracy by reducing potential human error and save storage space through decreasing the amount of paper records required in case files.

LIMS, Case Information, DNA Database