



A61 Team Effort: A Mid-Size DNA Lab's Approach to a Large Scale Validation Project

Kristy Kadash, PhD, Colorado Bureau of Investigation, Department of Public Safety, 690 Kipling Street, Suite 3000, Denver, CO 80215*

After attending this presentation, attendees will understand the approach taken by the Colorado Bureau of Investigation laboratory to complete a large scale validation project involving a unique combination of commercial products through collaboration with the associated manufacturers and private laboratories.

This presentation will impact the forensic science community by providing an alternative to conventional models of laboratory validation. It will also provide some lessons learned by the CBI laboratory during the validation process.

In 2008, the Colorado Bureau of Investigation (CBI) laboratory Biological Sciences section launched a large scale validation project intended to improve efficiency. The National Institute of Justice DNA Backlog and Capacity Enhancement grants awarded to the CBI lab in the years 2006 through 2009 provided the funding for this long-term plan. This project involved new extraction chemistry, new STR amplification kits, and a liquid handling system to automate the extraction, quantitation, normalization, and amplification steps of the DNA analysis process.

Preliminary evaluations of extraction kits, STR kits, and robotic platforms were conducted initially in order to select the products that best fit the laboratory's need. A series of known samples and mock evidence samples were prepared to examine the DNA yield of three commercial DNA extraction kits and the profile quality of two single reaction STR amplification kits. Various robotic platforms were evaluated by conducting visits to four different forensic DNA laboratories that had already validated and were using robots either in casework, databasing, or research capacities. As per Colorado state fiscal rules, a competitive bid was opened for robotic platforms that met the requirements compiled during the various site visits. At this time, all of the components of the validation project were determined, including the commercial kits and robot manufacturer.

At the beginning of this project, the CBI Biological Sciences section was comprised of 15 analysts in three laboratories across the state. As with most forensic DNA facilities, the section was under tremendous pressure to improve turnaround time and decrease case backloads in the face of increasing case submissions and budgetary restraints. Analysts could not be spared the time necessary to complete a thorough validation of this magnitude. As a result, it was decided that the CBI Biological Sciences section would employ a private lab to assist in the project. Another competitive bid was opened to contract a laboratory to design an efficient plan to incorporate all aspects of validating an extraction kit, a CODIS STR kit, a mini-STR kit, and a robotic liquid handler. The analysts in the CBI laboratories would conduct the experiments to gain the important hands-on experience with the new techniques. The contract laboratory would then analyze the experimental data provided by CBI analysts and prepare and organize the validation summary according to the requirements listed in Standard eight of the most current version of the FBI Quality Assurance Standards document.

This team approach to validation, a collaboration of a caseworking DNA laboratory and a private contract laboratory, was intended to provide an efficient and effective means for a mid-size lab to successfully accomplish a large scale validation project. As the project evolved, the team encompassed not only the private contract lab, but also the manufacturers of the products used in the validation. The combination of extraction kit, STR kits, and robotic platform that the CBI lab was intending to validate had not been done before. As a result, the CBI was involved in bringing together application specialists and researchers from all of the manufacturers in order to troubleshoot the numerous issues encountered. Not only did this benefit the CBI laboratory, but it also provided each of the manufacturers with the opportunity to expand their product capabilities.

Validations, Robotics, STR