OSAC BIOLOGY/DNA SCIENTIFIC AREA COMMITTEE STATUS REPORT

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Introduction

The Organization of Scientific Area Committees (OSAC) was formed in 2014 through a memorandum of understanding between the National Institute of Standards and Technology (NIST) and the Department of Justice (DOJ) for the purpose of developing documentary standards related to forensic science. NIST has the role of administrator for the OSAC and is responsible for developing a quality infrastructure for forensic science standards development. The OSAC is composed of several levels that participate in the development and promulgation of the standards. Subcommittees comprised of subject matter experts in specific forensic science disciplines review existing standards and draft new proposed standards. Five Scientific Area Committees (SAC), composed of subject matter experts from related subdisciplines oversee the activities of the individual subcommittees and review the work products of the subcommittees. The Biology/ DNA SAC oversees the Biological Methods Subcommittee, the Biological Data Interpretation and Reporting Subcommittee, and the Wildlife Forensics Subcommittee. The Scientific Area Committees then forward their work products for review to a Forensic Science Standards Board (FSSB) which includes researchers, forensic science subject matter experts, and statisticians. Three separate Resource Committees (Quality Infrastructure, Legal, and Human Factors) also play a critical role in the OSAC by providing input in their respective fields to the FSSB, SACs, and subcommittees during the document development process.

The objective of the OSAC is to provide technical leadership that will help enable the development and promulgation of consensus based documentary standards based on sound scientific principles that are fit for the purpose for which they are intended. Standards documents which have been through the entire OSAC process will be placed onto the OSAC Registry which can be incorporated into the accreditation process by laboratories and accrediting bodies. Since the inception of the OSAC in 2014, the organization has developed a number of internal processes necessary to accomplishing this objective. Education of the OSAC members, the forensic science community, and forensic stakeholders in the standards development process continues to be an important strategy in achieving the objective. A secondary, but equally important, objective of the OSAC is the identification of research needs related to various forensic methods. These research needs can then be considered by federal agencies such as the National Institute of Justice and the National Science Foundation when they prepare solicitations for research proposals.

Part of the education process has been explaining the different roles of the OSAC subcommittees and Standards Development Organizations (SDO). Neither the OSAC nor NIST is a Standards Development Organization. This is because the ability of NIST to serve as a SDO is limited by federal rules and regulations requiring the utilization of standards developed by the private sector whenever possible and the majority of OSAC members are forensic practitioners which means the OSAC doesn't have a balance between interested parties which is a key element of an SDO. The Biology/DNA SAC has selected the Academy Standards Board (ASB) formed by the American Academy of Forensic Sciences early in 2016 as the Standards Development Organization to which documents developed within the SAC will be submitted.

This report will focus on the efforts of the Biology/DNA SAC, the Biological Methods and the Biological Data Interpretation and Reporting subcommittees over the last two years. An outline of the progress made by each subcommittee in the review and development of documentary standards along with an overview of upcoming projects and the research needs identified by each subcommittee will be presented.

Discussion

One of the initial directives from the FSSB to the five SACs was the development of a terminology document which would encompass relevant terms from subcommittees for each of the SACs. This project was completed by the Biology/DNA SAC in August 2016. A terminology document comprised of over 400 terms relevant to serology, DNA testing, and wildlife forensics was submitted to the Quality Infrastructure Committee to incorporate into a composite glossary for all of the forensic science disciplines included in OSAC. The Biology/DNA SAC has also approved the following draft standards and submitted them to the ASB for consideration.

- Wildlife Forensics General Standard
- Standard for Verification of Mixture Interpretation Procedures
- Standard for Validation of Probabilistic Genotyping Systems

The Biological Methods Subcommittee is responsible for review and development of standards or guidelines related to training, education, and method validation for serological and DNA based methods used in forensic science laboratories. Since early 2015, task groups of this subcommittee have been developing several documents listed below. These documents have been reviewed by all of the Biology/DNA subcommittees, the SAC, and the three Resource Committees. Submission of these documents to the ASB by the end of 2016 is anticipated pending final edits based upon the reviews.

- Best Practices for Assessing Education Requirements for Forensic DNA Analysts
- Standards for Internal Validation of DNA Analysis Methods
- Standards for Internal Validation of Short Tandem Repeat Profiling on Capillary Electrophoresis Platforms
- Training Standard for Forensic DNA Analysis
- Training Standard for Forensic DNA Isolation and Purification
- Training Standard for Forensic Human mtDNA Analysis and Interpretation
- Standards for the Validation of Serological Methods
- Standards for the Analytical Procedures and Report Writing of Serological Methods
- Standard for Training in Serological Methods

The Biological Data Interpretation and Reporting Subcommittee was responsible for completing the draft Mixture Verification Procedure and Probabilistic Genotyping Validation standards which have recently been submitted to the ASB for consideration. Task groups of this subcommittee are continuing to work on the following documents:

- Statistical Interpretation
- Software Validation Guidelines

This subcommittee has also initiated a number of new document development projects. These new projects will involve both subcommittee members and OSAC affiliates, who are individuals

who have submitted an OSAC application but not yet been selected as a voting member. Affiliates play an important role by providing valuable input, manpower and perspective beyond that available within the subcommittee. The new projects that the Biological Data Interpretation and Reporting Subcommittee is initiating include:

- Internal Interpretation Protocol Evaluation
- Standard for Determination of Analytical and Stochastic Thresholds
- Standard for Training in Forensic Autosomal & Y STR Data Interpretation
- Standard for Reporting in DNA Analysis Involving Contamination or Failed Controls
- Standard for the Reporting of DNA Conclusions
- Formulating Propositions for Likelihood Ratios

As mentioned in the Introduction, a secondary objective of the OSAC is the identification of research needs which could help strengthen the understanding or practice of forensic science. Several research needs identified by the Biological Methods and Biological Data Interpretation and Reporting Subcommittees are listed below. Additional information concerning these research needs is available on the OSAC website at https://www.nist.gov/topics/forensic-science/osac-research-development-needs.

- Software solutions for Y-STR mixture deconvolution
- Impacts of laboratory assumptions and model decisions on continuous LRs
- Assessment of specific classes of evidence types to determine the necessity to quantitate DNA before amplification of human autosomal STR loci
- Characterizing, designing and constructing integrated DNA mixture interpretation solutions
- Proficiency Testing for Complex Data Interpretation and Biostatistical Evaluations
- Improvement of the Analysis of Serological Evidence: ID of Body Fluid

If the ASB approves a document as a standard that has relevance to Forensic Biology, the appropriate OSAC subcommittee will evaluate the approved standard for technical merit and it will be then be reviewed by OSAC units including the FSSB to determine if the document will be placed on the OSAC Registry. Individuals interested in the activities of the OSAC can receive the monthly newsletter and announcements by entering their email address at www.nist.gov/forensics, visiting the OSAC homepage at http://www.nist.gov/forensics/osac/index.cfm, or by applying for membership or affiliate status at https://www.nist.gov/forensics/osac-application.cfm.

The OSAC has accomplished quite a bit in just two years. A complex organization of more than 560 individuals from academia, the legal community, quality organizations, and forensic practitioners has been formed, developed internal processes, and prepared new draft standards for consideration by a Standards Development Organization. OSAC will continue to be successful as long as there are dedicated professionals who participate with their time, expertise, and insights.