

Poster Session

Wednesday, May 7 - 2:00 pm - 3:30 pm

Capital Ballroom



(P1) The Changing Counterfeit Pharmaceutical Landscape

Ashley Clements - NMS Labs

Large populations of counterfeit tablets are being tested by forensic laboratories with increasing frequency. When comparing pharmaceutical tablet submissions from 2016 and 2023, there was a significant increase in the number of counterfeit tablets received, particularly in tablets made to look like alprazolam, amphetamine, and oxycodone. These tablets often contain a lot of novel psychoactive substances and reflect the current trends in the drug market. It is necessary for labs to keep up with these changes as well as subsequent legislation to accurately identify counterfeit tablets and the compounds present in them.

(P2) Presumptive Identification of Psilocybin and Psilocyn in Neat Standards using Matrix Assisted Ionization in Vacuum (MAIV) and Time of Flight Mass Spectrometry (TOF-MS)

Maci Koester, Jennifer Clary, Deborah Brimijoin - Virginia Department of Forensic Science*

Psilocybin is readily converted to psilocyn through dephosphorylation under conditions such as heating or hydrolysis. Identification of psilocybin requires liquid chromatography-mass spectrometry (LC-MS) or gas chromatography-mass spectrometry (GC-MS) with derivatization. However, if these are unavailable, determining its presence is challenging. The Virginia Department of Forensic Science uses DART-TOF for presumptive screening, and under normal operating conditions psilocybin is converted to psilocyn. This study explores using 3-NBN crystals for matrix assisted ionization in vacuum (MAIV) with TOF-MS to eliminate the conversion, thereby maintaining psilocybin integrity.

(P3) LIMS Reports and Uses for Statistical Review and Monitoring

Deja Bean - Baltimore Police Department

At the start of 2023, multiple forensic units at The Baltimore Police Department (BPD) initiated the use of JusticeTrax, a form of LIMS. The Drug Analysis Unit (DAU) transitioned from a dated way of reporting to this system-based advancement. Now, instead of hand typing the components of a casefile (e.g. evidence descriptions, analysis notes, and reports), JusticeTrax generates worksheets and reports contemporaneously with case analysis and provides a variety of statistical reports. Such reports range from individual statistics to drug trends within the DAU. This system has successfully replaced the former style of reporting and the manual process of acquiring data used for monitoring in the laboratory resulting in consistency of reporting, reduced turn around times and backlogs, and allowing the unit to make informed decisions regarding casework trends and priorities.

(P4) It's Common Cents: How to Spend a Million Dollars in Five Months!

Julie Ferragut - DC DFS

The District of Columbia Department of Forensic Sciences (DFS) had lost accreditation and suspended all casework in the Forensic Science Laboratory for approximately two and half years which resulted in accumulating a DNA casework backlog of over one thousand cases. Prior to the loss of accreditation, the Forensic Biology Unit had eliminated the entire casework backlog. During the span of not being accredited, a backlog of over one thousand cases had accumulated. This poster will demonstrate the strategic plan of how the DFS was able to effectively and swiftly reduce the backlog by 90% utilizing multiple vendor laboratories, previously frozen CEFR funds and multi-agency collaborations.

(P5) Tool marks and Teeth: The Application of Forensic Technologies in the Interpretation of Prehistoric Drill Marks on Dental Remains

Dana D. Kollmann PhD, RPA - Towson University

The Late Woodland period in the Middle Atlantic spans AD 950-1600. Many Late Woodland sites contain human burials. This paper discusses tool marks discovered on dental remains and how these impressions provide a window into prehistoric human behavior.

(P6) Impact of Environmental Contaminants on Accuracy of Bacterial-Signature-Based Identification of Human Saliva Samples

Briley Peacher and Dr. Baneshwar Singh - Virginia Commonwealth University

Saliva is a valuable source of DNA in forensic investigations and can be found on various surfaces at crime scenes. Saliva can be present in spit, tissues, drinking glasses, cigarettes, envelope flaps, and even bite marks from victims of suspects. Evidence samples are often mixed with various contaminants from the scene such as dirt, and cleaning agents which can cause PCR inhibition or can change the microbial profile of the concerned sample. Changing the bacterial composition of the evidence sample may impact the accuracy of the bacterial signature-based method. However, little research has examined the effects of environmental contaminants on DNA recovery from saliva. This study evaluates the impact of bleach, Lysol, laundry detergent, and soil on bacterial composition and DNA yield from saliva samples. Forty saliva samples were collected from eight volunteers and mixed with contaminants. DNA extraction was done using the QIAgen DNA Investigator kit. Variable region 4 (V4) of 16S rDNA was amplified from extracted DNA, and the amplified product was cleaned and sequenced on the MiSeq FGx platform using the dual-index strategy. Bacterial community structure differs significantly in saliva mixed with soil samples compared to the other mixed and pure saliva samples. Except in some soil samples, indicator bacteria associated with human saliva (e.g., *Streptococcus*, *Veillonella*, and *Haemophilus*) were present in all samples included in this study. This study shows that the saliva mixed with soil may impact prediction accuracy of the bacterial signature-based method for body fluid identification. The prediction accuracy of saliva mixed with Lysol and detergent may not impact it too much.

(P7) Evaluating Human Factors in Forensic Anthropology: Preliminary Insights into Decision-Making Variability in Sex Estimation from Skeletal Traits

Marion Davidson MSc, ACSFS; Allysha P. Winburn PhD, RPA, D-ABFA; Sherry Nakhaeizadeh PhD - Loyola University Maryland*

Understanding the human factors that underscore the decision-making processes of examiners is crucial for enhancing and improving the reliability of forensic judgements. In this study, anthropologists were asked to score multiple sex indicating traits from the skull and pelvis of a single individual and then synthesize these scores into a final sex estimation. Although many of the individual traits were reproducibly scored, with some examiners yielding completely identical initial judgements, variation existed within the final sex estimations between participants. Preliminary results suggest that non-metric anthropological methods may be subject to issues of human factors, particularly when examiners are asked to synthesize initial data into an overall conclusion. These findings highlight the need for further research into the decision-making processes of forensic partitioners, as well invite further discussion around the need for comprehensive statistical frameworks to improve the reliability of forensic judgements.

(P8) The Development of LC-MS/MS to Separate and Quantitate Cannabinoids and Metabolites

Madison Calvert, Ciena Bayard, Alaina K Holt, Justin L Poklis, Michelle R. Peace - Virginia Commonwealth University*

The Washington D.C. Office of the Chief Medical Examiner's Office (OCME) toxicology lab currently uses a gas chromatography tandem mass spectrometry method to separate delta-9-THC and the carboxy metabolite. Presented is a liquid chromatography tandem mass spectrometry (LCMSMS) method for the separation and quantitation of a select panel of cannabinoids and metabolites. Chromatographic separation for delta-9-THC, (-)-11-hydroxy-delta-9-THC (delta-9-THC-OH), (-)-11-nor-9-carboxy-delta-9-THC (delta-9-THCA), delta-8-THC, delta-8-THC-OH, delta-8-THCA, (6aR,9R)-delta-10-THC, (6aR,9S)-delta-10-THC, cannabinol (CBN), cannabidiol (CBD), cannabigerol (CBG), cannabichromene (CBC), R-hexahydrocannabinol (R-HHC), and S-HHC with corresponding deuterated internal standards was achieved using a Poroshell 120 EC-C18 column (3.0 mm x 75 mm x 2.7 µm) and Poroshell 120 EC-C18 guard column (3.0 mm x 5 mm x 2.7 µm) held at 40°C on an Agilent 1290 Infinity II. The method has a run time of 14 minutes with a gradient of 22:78 for the first 10 minutes, a ramp to 2:98 for a minute, and 2 minutes to return to starting conditions of 0.1% formic acid in water (A) and methanol (B) at a flow rate of 0.4 mL/min. The bias, carryover, calibration model, limit of detection (LOD), limit of quantitation (LOQ), ionization suppression/enhancement, and matrix and other cannabinoid interference studies were conducted.

(P9) Will a Transition to the VeritiPro Thermal Cycler from the 9700 Require a Complete Revalidation of STRmix Before Implementation?

Cathryn Shannon - Virginia Department of Forensic Science

Casework DNA profile interpretation parameters (e.g., stutter, stochastic threshold, peak height ratio) were assessed using known samples with the VeritiPro™ thermal cycler (VP). Both the PowerPlex® Fusion 5C System (Fusion) and AmpFISTR™ Yfiler™ PCR Amplification Kit were tested and analyzed using the 3500xl genetic analyzer and GeneMapper® ID-X. The data were found to be comparable to that generated using similar DNA samples and the same cycling parameters on the GeneAmp™ PCR System 9700 (9700). Additionally, 15 two-person mixtures covering ratios that ranged from 1:1 to 1:40 were amplified for Fusion using the same master mix in both the VP and 9700 thermal cyclers and analyzed using the STRmix™ system. No statistically significant difference was detected in the contributor-specific likelihood ratios.

(P10) Accessibility of Standard Operating Procedures For Firearm and Toolmark Analysis

Gabrielle Tavarez and Marion Davidson - Loyola University Maryland*

Discussions within the forensic science community have highlighted the need for increased transparency, including the open access of standard operating procedures (SOPs). Using the ANAB Directory of Accredited Organizations, this research assessed the availability of Firearm and Toolmark SOPs from U.S. laboratories. Preliminary results reveal transparency concerns regarding access to quality assurance procedures, as few labs make these documents publicly available. Arguably, the open access of SOPs and related materials will help promote public trust while encouraging resource sharing for the improvement of effective laboratory practices.

(P11) Utilizing Fragmentation of the Gentueri CollectEject™ Swab for CODIS Upload

Hannah Schaeffer and Pamela Marshall, Ph.D. - Duquesne University*

The Gentueri CollectEject™ Swab is a DNA collection swab type that is unique by the means of its ejection method, its desiccant drying technique, its scalpel-like shape, and its multilayered cellulose material. This study examined the smallest number of punches taken from the Gentueri CollectEject™ Swab to yield DNA profiles suitable for CODIS upload and explored its effectiveness in DNA collection. The results suggest three punches are the smallest amount utilized for successful quantification, which provides a suitable profile for CODIS upload. A smaller punch amount would not be suitable for meeting the 1 ng/μL threshold, resulting in little to no peaks appearing at loci markers on the electropherogram. Since there is a limited amount of DNA recovered at crime scenes, proving to be an issue for forensic laboratories, this research permits the retesting of DNA by the application of swab tip fragmentation for extraction.