

Chemistry

Forensic Biology

Physical Evidence

Toxicology

Forensic Training

Quality Assurance

Research

DIVISION OF TECHNICAL SERVICES UPDATE

Alka B. Lohmann, Director of Technical Services
Presented to the Scientific Advisory Committee
October 8, 2024





CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

**Virginia Department of Forensic Science
Crime Laboratory System**

Fulfills the requirements of

ISO/IEC 17025:2017

Accreditation Requirements for Forensic Testing and Calibration (2023)

FBI Quality Assurance Standards for Forensic DNA Testing Laboratories:2020

FBI Quality Assurance Standards for DNA Databasing Laboratories:2020

In the field of

Forensic Testing & Calibration

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scopes of accreditation can be verified at www.anab.org.


Pamela L. Sale, Vice President, Forensics

Expiry Date: 30 September 2026

Certificate Numbers:

FT-0051

FT-0052

FT-0053

FT-0054

FC-0004



Accreditation

- Notified on September 16 of continuation of accreditation
- Certificates and Scopes are available on the DFS website: <https://www.dfs.virginia.gov/about-dfs/accreditation/accreditation-documentation/>
- Current cycle expires September 30, 2026

Forensic Training



- 112th FSA Session graduated June 28, 2024
- Annual Retraining – September 4-6
- 113th FSA Session began September 16
 - Graduation November 15
- Second Forensic Trainer Senior started July 10
- Continuation funding for part-time Forensic Trainer
- 6 Short Courses since April
 - Basic Crime Scene Photography
 - Alternate Light Source, BLUESTAR[®] and Impression Evidence



DFS Representatives on OSAC

- Digital Evidence Subcommittee – Jesse Lindmar
 - Quality Task Group Representative
- Footwear & Tire Subcommittee – Cory Bartoe
- Forensic Toxicology Subcommittee – Rebecca Wagner, Ph.D.
 - Subcommittee Vice Chair
- Human Forensic Biology Subcommittee – Susan Greenspoon, Ph.D.
- Ignitable Liquids, Explosives, & Gunshot Residue Subcommittee – Brenda Christy
 - Subcommittee Chair
- Ignitable Liquids, Explosives, & Gunshot Residue Subcommittee - Mary Keehan
- Video/Imaging Technology and Analysis Subcommittee – Patricia Mullaney
 - Subcommittee Executive Secretary



Chemistry Research Staffing

- 7 Full-time Forensic Laboratory Specialists (FLSs) VI
 - 2 Overdose Data to Action in States (OD2A-S) funding with OCME
 - 2 NIJ research grant funding
 - 1 response to legislative changes General Fund
- 1 Full-time FLS III (OD2A-S)



Chemistry Research Projects

- Controlled Substances
 - Fentanyl quantitation validation of DEA method (hydrogen carrier gas)
 - Evaluation of beverages and syrups using semi-quantitative analysis of cannabis method
- Toxicology
 - Headspace ethanol analysis
 - Analytical workflow for the analysis of psychedelics
 - Xylazine stability in antemortem and postmortem blood
 - Presumptive identification of nitazenes using qTOF
 - Miscellaneous basic drug extraction with Hamilton automation
 - Miscellaneous basic drug extraction verification with carryover tools
 - Addition of compounds to miscellaneous basic drug extraction
 - Revitalization of novel psychoactive substances qualitative analysis
 - Evaluation of base screen extractions using GC-MS



Disclosure – Western Firearms

- Monitoring Activity – Unexpected Result
- Proficiency Test - CTS 23-5262
- Corrective Action initiated
- Temporarily suspended firearms comparisons
- Resumed comparisons July 16, 2024

- ANAB Heads Up – March 15, 2023 -
<https://anab.qualtraxcloud.com/ShowDocument.aspx?ID=29808>



Instrument Support

- Smith v Arizona
- "Instrumental analysis performed by someone qualified to perform such testing but who is not the issuing examiner. The issuing examiner requests the instrument support and will interpret the data/results in conjunction with other examinations they have performed in the case. Instrument support does not include typical batch analysis within a laboratory's Forensic Biology or Toxicology Section."
- "If any Instrument Support testing was performed by another individual, their name, the method used and Laboratory/Section, if different from their own" will be reported on the Certificate of Analysis

Chemistry Program Update

Robyn Weimer

Chemistry Program Manager



Trainee Update – Trace Evidence

Central Laboratory:

- One (1) trainee in Tape, expected completion Q4 2024
- One (1) trainee in Hair, expected completion 2025
 - One hair trainee completed training September 2024
- One (1) trainee in Glass, expected completion Q2 2025
 - One glass trainee completed training August 2024
- One (1) trainee in Fracture Match/Glass - Sequence of Impact/Glass - Direction of Impact, expected completion December 2024



Trainee Update – Trace Evidence

Central Laboratory:

- One position in recruit
- Working towards 3 qualified examiners per subdiscipline

ANAB Scope Disciplines	Subdiscipline	Central Section Supervisor	Examiner A	Examiner B	Examiner C	Examiner D	Examiner E	Eastern Section Supervisor	Examiner F	Western Section Supervisor	Examiner G
FD&E	Fire Debris		X		X			X	X		X
	Explosives		X		X						
Materials (Trace)	Fiber / Textile	X		X							
	Filament / Bulb							X		X	
	Fracture Match	X	X	X	X	O		X	X	X	X
	General Chemical / General Unknowns	X	X	X	X			X	X	X	X
	Glass		O			X				X	X
	Hair	X			O		X				
	Paint / Coating							X	X	X	
	Primer Residue	X		X							
	Tapes & Adhesives	O									
Instrumentation	GC-MS-FID		X		X			X	X	X	X
	SEM/EDS	X	*		*			*	*	*	*
	FTIR	X	X	X	X			X	X	X	X
	GRIM		O			X				X	X
	MSP	X		X							
	XRD		X		X					*	*
	IC	*	X		X					*	*
	uXRF		O				O			O	O

X = qualified/authorized
*** = data interpretation only**
O = in training



Trainee Update – Controlled Substances

Central Laboratory:

- One trainee expected to complete training November 2024

Western Laboratory:

- One trainee completed training July 2024

Northern Laboratory:

- One trainee completed training in April 2024
- Two (2) trainees expected to complete training July 2025

Eastern Laboratory:

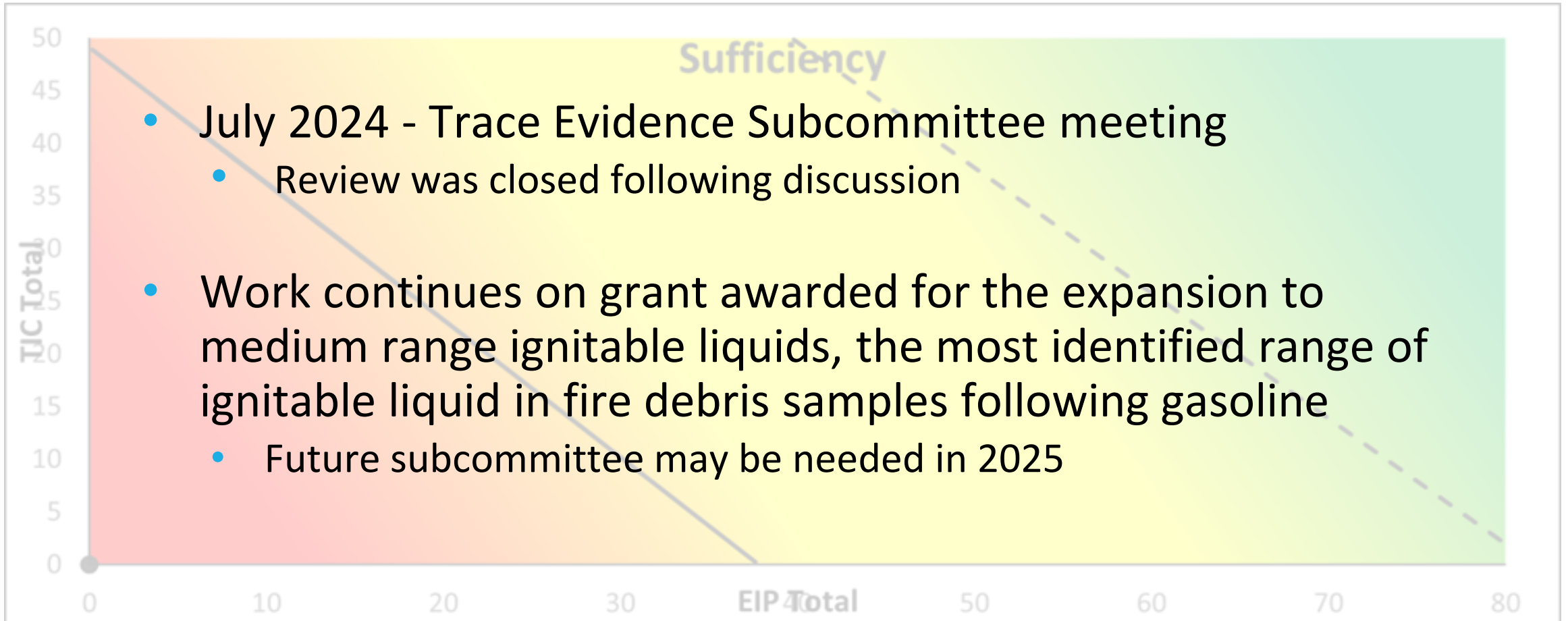
- Currently, no trainees or positions in recruit



Training – Trace Evidence

- Fire Debris Data Interpretation Workshop – MAFS
 - Recent information on data interpretation, ASTM standardization and logic workflows evaluating GC-MS complex data
 - September 9
- Primer Residue Data Interpretation Workshop – ASTEE/NEAFS
 - Practical ID of Environmental Particles Similar to Gunshot Residue & Unusual Elemental Profiles
 - October 22

Sufficiency of Data for Identification of Ignitable Liquids





Training – Controlled Substances

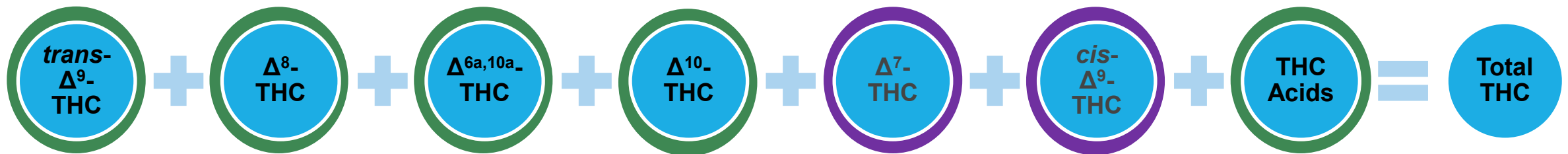
Statewide Section Meeting

- September 17 – 19
- Included a tour of CBP Lab, mushrooms workshop, professional meeting teach-backs, and presentations focused on a variety of topics (e.g., testimony, in-house research, sampling, dark web, quantitations, tablet counting)

United Nations Office on Drugs and Crime (UNODC) Symposium

- October 8 – 10
- 3 thematic sessions: licit to illicit opioids; synthetic cathinones manufacture and characterization; next wave NPS

Total THC includes sum of THC and THC acid for all isomers



- Total THC greater than 0.3% is marijuana
- DFS expanded semi-quantitative method from *trans*- Δ^9 -THC to include the most common THC isomers and their acids
- Most recent validation will add *cis*- Δ^9 -THC and Δ^7 -THC
 - DX Subcommittee

Board of Pharmacy Expedited Scheduling



- DFS recommended four (4) compounds in January 2024. These compounds will become scheduled on October 9, 2024.

- DFS recommended four (4) compounds in April 2024. These compounds will become scheduled on October 9, 2024.

Hallucinogenic Properties:

- 4-fluoro-MBZP
- 4-fluoro-alpha-PiHP
- Pyrazolam

Cannabimimetic Agent:

- MDMB-BUTINACA

Board of Pharmacy Expedited Scheduling



DFS recommended two (2) compounds in July 2024. The compounds were considered at the Board's September 24th meeting and are pending final approval.

Depressant Properties:

- Phenazepam

Cannabimimetic Agent:

- MDMB-5Me-INACA

Forensic Biology Program

Brad C. Jenkins

Forensic Biology Program Manager

Examiner/Biologist Staffing Update – Forensic Biology



Central Laboratory:

- 6 in training (5 CW, 1 DB)
- 1 in recruit DB

Northern Laboratory:

- 1 in recruit

Western Laboratory:

- 1 in training
- 2 in recruit

Eastern Laboratory:

- Fully staffed

*4 scientists have completed training since last meeting
1 N, 1 DB, 1 Mito, 1 Biologist C



Staff Internal Training Projects

- True Allele - Training 2 examiners continues
- Future Relationship Stats Training - Northern
- Dates of STRmix training class for additional staff are being determined



Validation Update

- New Robotics Biomek i5
 - Validation continues
- New Thermal Cyclers (VertiPro and Proflex)
 - Validation continues



Outsourcing Backlogged Cases

- Approximately 600-800 property crime, possession, robbery cases
- Private laboratory will issue report
- Ownership reviews and CODIS uploads by DFS
- Customer notice being drafted

Statewide Forensic Biology Continuing Education Meeting



- Richmond, October 7 - 9
 - 15 external speakers from around the country
 - Big thank you to Kim F. and Lashanda O. for organizing
 - MAAFS meeting for 2025 (Richmond, May 4 - 9)

Customer Notice – DNA Allele Tables

- As of July 1, DNA Certificates of Analysis no longer include a Table of Typing Results
- HB 898 (Kent) eliminated the requirement that DNA profiles be included in any DFS Certificates of Analysis for the results of that analysis to be admissible in criminal proceedings
- Additional language was added to Virginia Code § 19.2-270.5 to clarify that the underlying case file documentation, including the developed evidentiary and comparison profiles, could be obtained with a lawfully served subpoena *duces tecum* under Virginia Code § 19.2-187.2 (as with any other DFS case file documentation)



COMMONWEALTH of VIRGINIA

DEPARTMENT OF FORENSIC SCIENCE

OFFICE OF THE DIRECTOR
A Nationally Accredited Laboratory
dfs.virginia.gov

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Richmond, Virginia 23219-1416
(804) 786-2281 FAX (804) 786-6857

AGENCY NOTICE

To: All Agencies Served by DFS
From: Linda C. Jackson, Department Director 
Date: July 1, 2024
RE: **Removal of Typing Results Tables from Department of Forensic Science Certificates of Analysis**

Historically, Certificates of Analysis for forensic biology (DNA) cases have included a Table of Typing Results as an appendix if the forensic scientist's examination of the evidence resulted in a positive probative association (i.e., non-elimination). In recent years, other forensic laboratories have moved away from the inclusion of these tables in their reports. This change occurred due to (1) genetic privacy concerns and (2) scientific advancements with DNA probabilistic genotyping. Tables of typing results contain genetic information of victims, consensual partners, and/or suspects, and they can be made part of the public record when the Certificate of Analysis is filed in a court proceeding. Furthermore, the allelic tables are not reflective of all the data that is used in current DNA interpretation methods which was not the case when these tables were first introduced over 25 years ago.

Earlier this year, House Bill 898, carried by Delegate Hillary Pugh Kent, was passed by the General Assembly. The bill (now Chapter 210 of the 2024 Acts of the Assembly) amends Virginia Code §§ 19.2-270.5 and 19.2-310.4 to eliminate the requirement that DNA profiles be included in any DFS Certificates of Analysis for the results of that analysis to be admissible in criminal proceedings. Additional language was added to Virginia Code § 19.2-270.5 to clarify that the underlying case file documentation, including the developed evidentiary and comparison profiles, could be obtained with a lawfully served subpoena *duces tecum* under Virginia Code § 19.2-187.2 (as with any other DFS case file documentation). Please note that DFS is not considered a party under Rule 3A:12(i) of the Rules of the Supreme Court of Virginia.

Customer Notice – Private Labs for DNA

- For some cases, law enforcement agencies may want to utilize a private laboratory for DNA analysis.
- This most often occurs when law enforcement wishes to utilize emerging technology that is not yet offered by DFS.
- Prior to initiating any testing by a vendor, LEAs should discuss the sought after testing with DFS Forensic Biology supervisory staff.
- Some vendors provide types of DNA analyses that cannot currently be uploaded and searched in CODIS.
- When uploading and searching DNA profiles, DFS must comply with NDIS Operational Procedures.



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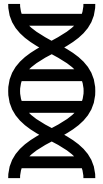
700 North 5TH Street
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DFS POLICY NOTICE

To: All Agencies Served by DFS
From: Linda C. Jackson, Director
Date: August 1, 2024 *LCJ*
RE: **Utilization of Private Laboratories for DNA Cases**

For some cases, Virginia law enforcement agencies may want to utilize a private laboratory for DNA analysis of evidence. This most often occurs when law enforcement wishes to utilize emerging technology that is not yet offered by the Virginia Department of Forensic Science (DFS). To ensure that the law enforcement agency (LEA) is appropriately informed regarding potential pitfalls in the use of a private laboratory, DFS provides the following caveats below. LEAs seeking to contract with a private laboratory should discuss potential issues with the vendor laboratory before testing is initiated.

- (1) DFS can identify potential private laboratories that may conduct the testing sought by the law enforcement agency, but it will not recommend one vendor over another. Agencies should conduct the appropriate research with fellow LEAs to determine which vendors have provided the best services to others in other cases/investigations.
- (2) Prior to initiating any testing by a vendor, LEAs should discuss the sought after testing with the Forensic Biology Program Manager, the Assistant Forensic Biology Program Manager, or one of the Forensic Biology Section Supervisors from DFS. DFS staff can confirm that the appropriate Memorandum of Understanding (MOU) is in place if needed prior to the contracting for services by the LEA with the selected vendor.
- (3) **The MOU must be in place with the selected vendor BEFORE ANY TESTING IS CONDUCTED to ensure that any DNA profiles developed during the analysis can be uploaded and searched in the Combined DNA Index System (CODIS) by DFS.** This requires that the vendor agree to (a) comply with the accreditation requirements under federal law, (b) comply with the Quality Assurance Standards for Forensic DNA Testing Laboratories, (c) submit to on-site visits either by the DFS Technical Leader or their designee or submit to an on-site visit by a designated FBI employee, and (d) cooperate with DFS on any technical review or verification process DFS may require for DNA data developed.



Forensic Investigative Genetic Genealogy

- DFS does not conduct the ancestry DNA testing needed for FIGG
- DNA data developed using ancestry testing is not suitable for searching in CODIS
- Agencies will need to contract with private laboratory for FIGG testing
- How can DFS help?
 - By reviewing case files previously tested by DFS help determine which samples may most likely yield a useable result
 - By providing quantitation and other technical information regarding the DNA extracts created during the previous testing to the agency or the contracted laboratory



Developments with Rapid DNA

- Rapid DNA instruments are in place in two LE agencies: Virginia State Police and Fairfax PD
 - They each have a different instrument type (ANDE and Thermo Fisher)
 - Both agencies have had several Rapid DNA success stories, including body identifications
- Non-crime laboratory uses of these instruments are currently limited to booking station applications and casework/reference samples that do not need to be searched in a state or national database



Rapid DNA Testing by Partner Agency

The FBI is updating rules to allow for profiles developed using Rapid DNA by law enforcement to be searched in CODIS when:

Laboratory

- Expand Scope of Accreditation to include partner LE site(s)
- Laboratory creates a Laboratory Rapid DNA Administrator that is responsible for administration and security of the Rapid DNA Program
 - Requires validation testing, development of procedures, development of training programs for both laboratory staff and partner agency
 - Requires participation in proficiency testing, conducting data review, and issuing reports

Law Enforcement

- LE creates a Forensic Rapid DNA Lead Operator responsible for routine maintenance and quality control, and must ensure compliance with procedures and laboratory policies
 - Must maintain documentation and an evidence control program that ensures integrity of the evidence
 - Agency will need to sign MOU with laboratory

Physical Evidence Program Update

Samantha M. Glass

Physical Evidence Program Manager

Latent Prints & Impressions Staffing



- One Supervisory Latent examiner took another position (Northern, June 2024), one qualified Latent examiner hired (Eastern, August 2024), completion of training expected January 2025
- In recruit: Northern - Supervisor position
- In background: 1 trainee in Central
- In training: 1 in Western for Impressions, completion expected by year end

Latent Prints & Impressions Continuing Education



- Section Meeting held at the Eastern Laboratory in September
- Planning for Impressions Section Meeting to be held in October



Latent Prints

- The upgrade to the Virginia State Police Automated Fingerprint Identification System (AFIS) was deployed on 2/11/2024
- Troubleshooting continues

Firearms & Toolmarks Staffing



- One FS NIBIN qualified in Northern - July 2024, one FS NIBIN resigned - September 2024
- In recruit:
 - 2 in Central (FS NIBIN), 1 offer made
 - 2 in Eastern (Examiner and FS NIBIN)
 - 1 in Western (Supervisor)
- In training:
 - 2 in Central (Examiner)
 - 1 in Western (Examiner)
 - 2 in Eastern (Examiner)



Firearms & Toolmarks

National Integrated Ballistic Information Network (NIBIN)

As of September 19, 2024, there have been 415 new NIBIN potential associations.

- Western - 77
- Northern - 74
- Eastern - 103
- Central – 161

8 hits have been confirmed thus far this year.

3,932 since this system was received in April 2002.



Local Agencies with NIBIN

- Chesapeake
- Fairfax
- Newport News/Hampton (entry & correlation)
- Norfolk
- Richmond
- Virginia Beach
- VSP (Culpeper and Salem)
- Danville
- Henrico
- Roanoke City
- Accomack County
- Portsmouth
- ATF (Boulders) assisting Richmond area agencies

Firearms & Toolmarks Emerging Technology



- Purchasing new microscope cameras for comparison examiners to increase quality of documentation photos and to allow for remote consultation and potential verifications
- Evaluating 3D technologies for virtual comparison microscopy to determine future direction

Digital & Multimedia Evidence Staffing Update



- Fully Staffed
- 1 FLS, hired May 2024



Digital & Multimedia Evidence

- Providing mobile device extractions electronically to Henrico PD and Stafford SO via SharePoint, in addition to traditional means
- This method provides content to the investigator weeks faster than traditional methods
- Introduced the use of read-only USB flash drives for returning examination results as we move away from using multi-layer Blu-ray optical discs
- Also exploring cloud-based options to remove concerns of physical media longevity

Toxicology Program Update

James W. Hutchings, Ph.D.

Toxicology Program Manager



Toxicology

- Methodology - update
 - No methods added since last meeting
 - In progress
 - Nitazenes – validation in progress
 - Miscellaneous Base Drugs – addition of more targets, automation
 - Novel Psychoactive Substances – updating method target list
 - Blood Alcohol
 - Switching to Nitrogen
 - Redevelopment and validation of all parameters
 - Hallucinogens – psilocybin, LSD, DMT



Staffing

Vacancies

- Toxicology
 - C: No vacancies
 - W: 1 Forensic Toxicologist (FT), 1 Forensic Scientist (FS)
 - E: 1 FS, 1 Forensic Laboratory Specialist (FLS)
 - N: No vacancies

Breath Alcohol

- 1 FS

Trainees

- Toxicology
 - Central – 2 FT
- DTS
 - FLS (pending background investigation)
 - ELISA Screening of deidentified impaired driving cases

Breath Alcohol: Retirement of Shelly Billeter;
Rebecca Daner promoted to Group Supervisor



Grants

Received DMV Highway Safety Office Grants

- Breath Alcohol
 - To continue to offer licensing and training and to retain one Forensic Scientist
 - Maintain mobile access and electronic processes
- Toxicology
 - Retain two FLS II (part time)
 - Retain/hire six FLS II/III



Toxicology Statistics

- Cases submitted by examination type

	2022	2023	2024 (first half)
OCME*	5139	5386	2467
DUID	2583	2825	1287
DUI	2327	28	-
DUI+THC	-	2584	1341
Tox-Other	753	673	328

*Outsourcing of OCME cases



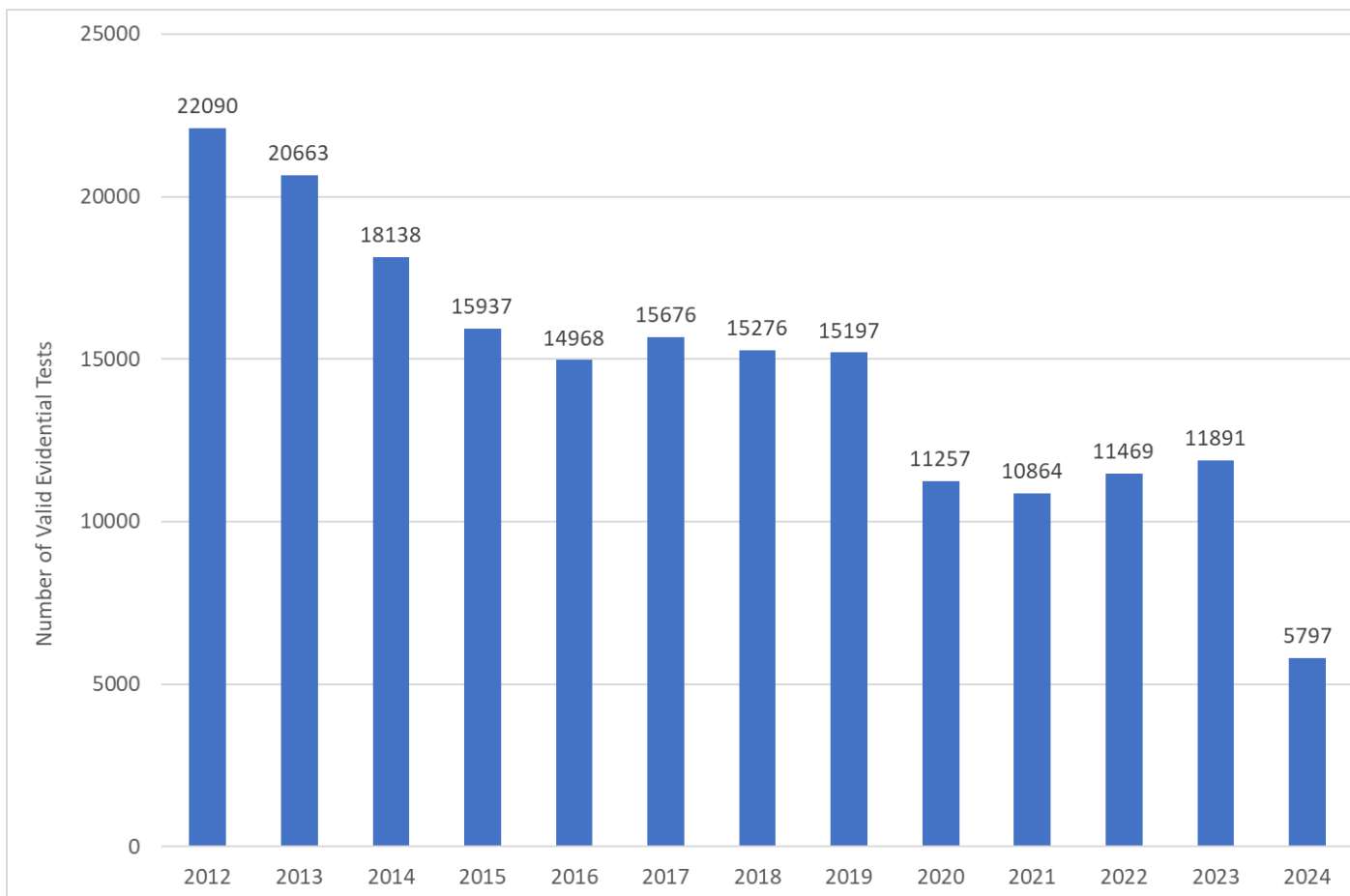
Toxicology – Items of Note

- ~25% of cases with BAC >0.100 % w/v had a quantifiable THC concentration (CY23 = ~23%)
- Reduction in "Inconclusive" results due to new methodology
 - ~17% --> ~5%

CY23 DUID and DUI+THC Case Statistics		
	Cases with BAC ≥0.100% w/v	Cases with BAC <0.100% w/v
Average THC Concentration	0.0053 mg/L	0.0082 mg/L
Median THC Concentration	0.0035 mg/L	0.0045 mg/L
First Half CY24 DUID and DUI+THC Statistics		
Average THC Concentration	0.0060 mg/L	0.0079 mg/L
Median THC Concentration	0.0035 mg/L	0.0049 mg/L



Breath Alcohol Statistics



*2024 – January through June



Breath Alcohol Updates

- New Breath Alcohol Instrument
 - Complicated procurement that has taken longer than expected
 - Anticipate awarding contract before the end of the year



Thank you!