

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 11, 2023





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

ANAB Forensic Testing & Calibration AR 3125:2019

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

- Completed Surveillance Document Review – May 2023
- Surveillance Assessment week of May 20, 2024
- 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



Quality Management System

- Overview provided to the FSB on July 19, 2023
 - <https://dfs.virginia.gov/wp-content/uploads/Quality-Management-System-FSB-July2023.pdf>
- Updates provided at each laboratory location during July and August



Figure 1: Quality System, Quality Assurance, and Quality Control Relationships

Forensic Training



- 109th FSA Session graduated June 23, 2023
- 6 Short Courses in July & August
 - Basic Crime Scene Photography
 - CSI/Laboratory Overview
 - Alternate Light Source & Impression Evidence
- Forensic Science Academy Alumni Association Annual Retraining Seminar September 6-8
 - Case studies, legal and laboratory updates and new crime scene documentation technologies
- 110th FSA Session began September 18, 2023



DFS Representatives on OSAC

Digital Evidence Subcommittee – Jesse Lindmar

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



Grant Update – Chemistry Research

- Expanded Quantitative Cannabinoid Testing in Biological Specimens to Combat the Ever-Changing Cannabis Landscape
 - End date December 2023 (1 year extension approved)
 - Validation of quantitative method complete
 - Qualitative validation in process

New Grant Awards – Chemistry Research



- New Age Therapeutics: Development and Validation of an Analytical Workflow for the Analysis of Psychedelics in Biological Matrices
 - Method development and validation of screening and confirmation techniques
 - Stability evaluation including long-term storage and extraction
- Pivoting Headspace Ethanol Analysis to Accommodate Modern Day Scenarios
 - Conversion of helium to hydrogen or nitrogen mobile phase
 - Re-evaluation and optimization of sample preparation and analysis conditions (e.g., dilution ratio, vial size, equilibration temperature/time)



Chemistry Research Update

- Staffing
 - 3- Full-time Forensic Laboratory Specialists (FLSs) VI
 - 1 on Overdose Data to Action in States (OD2A-S) Funding with OCME
 - 1- Full-time FLS III (OD2A-S)
- In Recruit
 - 1- Full-time FLS VI (OD2A-S)

Chemistry Program Update

Robyn Weimer

Chemistry Program Manager



Trainee Update – Trace Evidence

Central Laboratory:

- One (1) trainee completed Primer Residue training in July 2023
- One (1) trainee in Tape, supervised casework remaining
- Two (2) trainees in Hair, expected completion Q1 2024
- Two (2) trainees in Glass, expected completion Q2 & Q3 2024



Trainee Update – Controlled Substances

Central Laboratory:

- One (1) position in recruit

Northern Laboratory:

- One (1) position in recruit

Western Laboratory:

- One trainee expected to complete training April 2024

Eastern Laboratory:

- One trainee expected to complete training March 2024



Training – Trace Evidence

μXRF Training

- 2 day training from Bruker - Nov 2023
- 3 day training from Troy Ernst, Michigan State Police - Dec 2023
- To include: 2 examiners, 2 trainees

Meeting Teach-back –

- 2 examiners attended Midwestern Association of Forensic Scientists meeting in Detroit, MI
- October, date TBD



Training – Controlled Substances

Statewide Section Meeting: October 17 – 19, 2023

- Workshop on chromatographic theory, calibration science, and quantitative best practices
- THC Isomer workshop
- Psychological Safety workshop
- Hearing from a Detective from Narcotics Unit
- Behind-the-scenes tour of the VA Supreme Court



Instrumentation Changes

- μ XRF - new
- SEM-EDS - replacement
- LIBS - removed
- DiscovIR - replacement

Board of Pharmacy Expedited Scheduling



DFS recommended five (5) compounds in January 2023. These compounds became scheduled on September 27, 2023.

DFS recommended five (5) compounds in April 2023. These compounds became scheduled on September 27, 2023.

- 3 synthetic opioids
- 2 compounds expected to have depressant properties

Board of Pharmacy Expedited Scheduling



DFS recommended two (2) compounds in July 2023. The compounds were considered at the Board's September 26th meeting and are pending final approval.

Synthetic Opioid:

- N-desethyl Isotonitazene

Cannabimimetic Agent:

- EDMB-4en-PINACA

DFS provided consultation to the Board in August 2023, pursuant to article § 54.1-3443(D), regarding their consideration of placing Tianeptine into Schedule I. This compound was also considered at the Board's September 26th meeting.

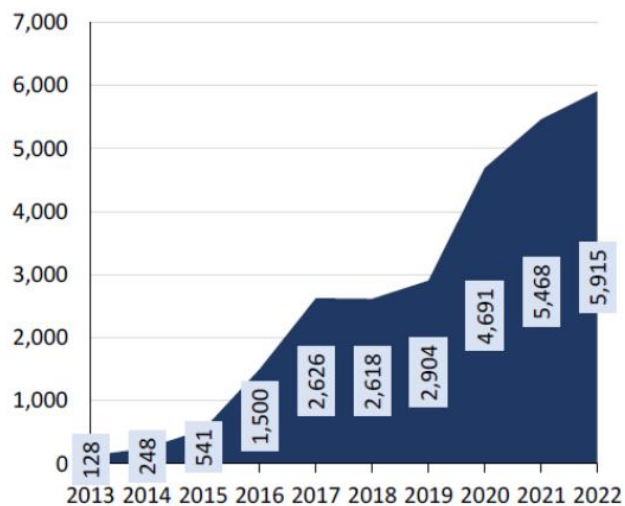


Drugs Submitted to DFS in 2022

Illicit Synthetic Opioids

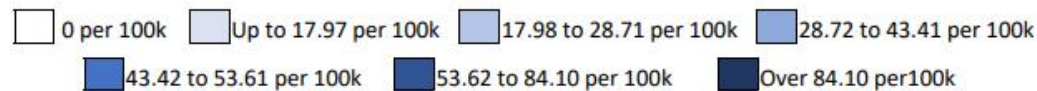
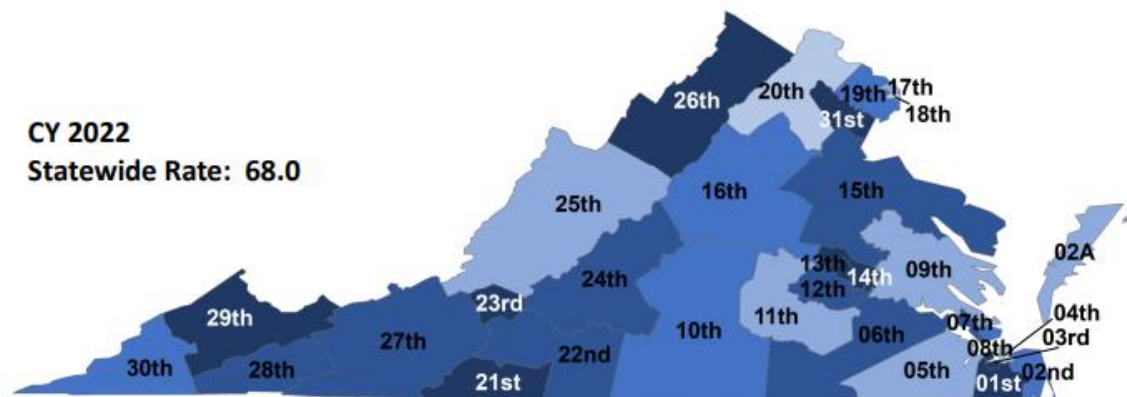


Illicit Synthetic Opioid Submissions
CY2013-2022



**NEW
REPORT:
DRUG CASES
SUBMITTED TO DFS
IN CY2022**

**CY 2022
Statewide Rate: 68.0**



Legislation to regulate hemp products effective July 1, 2023

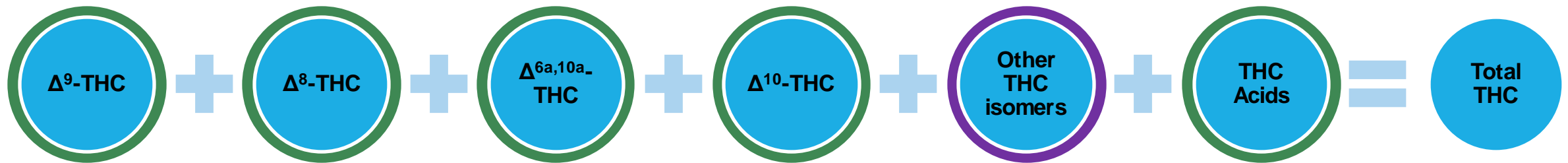


Definition Changes in Chs. 744 and 794:

"Tetrahydrocannabinol" means any naturally occurring or synthetic tetrahydrocannabinol, ***including its salts, isomers, and salts of isomers*** whenever the existence of such salts, isomers, and salts of isomers is possible within the specific chemical designation and any preparation, mixture, or substance containing, or mixed or infused with, any detectable amount of tetrahydrocannabinol. ***For the purposes of this definition, "isomer" means the optical, position, and geometric isomers.***

"Total tetrahydrocannabinol" means the sum, after the application of any necessary conversion factor, of the percentage by weight of tetrahydrocannabinol and the percentage by weight of tetrahydrocannabinolic acid.

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 to include the most common THC isomers and their acids
- Validations continue to encompass additional isomers

Table 2: Updated submission guidelines for Cannabis

Offense	Policy
<ul style="list-style-type: none"> Possession of marijuana and marijuana products (§ 4.1-1100) 	<p>Accepted: Quantities over 4 ounces</p> <p>Accepted with Limitations: Contested civil offenses (greater than 1 ounce but less than 4 ounces) submitted by law enforcement</p> <p>Not Accepted: Quantities under 1 ounce OR uncontested civil offenses</p>
<ul style="list-style-type: none"> Home cultivation of marijuana (§ 4.1-1101) 	<p>Accepted: Five or more separately packaged plants or portions thereof, if a plant count is needed</p> <p>Not Accepted: Four or less plants, or portions thereof</p>
<ul style="list-style-type: none"> Possession of marijuana and marijuana products by individuals under the age of 21 (§ 4.1-1105.1) Other misdemeanors with no weight thresholds (§§ 4.1-1107, 4.1-1108, 4.1-1109, and 4.1-1110) Manufacture, Sell, Distribute or PWID Marijuana (§ 18.2-248.1) <ul style="list-style-type: none"> Offering for sale or selling at retail a substance that has total THC that is outside the legal limit for hemp products (§ 3.2-4112) or industrial hemp extracts (§ 3.2-5145.1) and would, therefore, meet the definition of marijuana under Virginia Code §§ 4.1-600 and 18.2-247 Possession of marijuana by prisoners (§ 53.1-203(6)) and delivery of marijuana to prisoners (§ 18.2-474.1) 	<p>Accepted: All weighable quantities (not residue amounts) seized during criminal investigations or were the subject of controlled purchases</p> <p>Not Accepted: Edibles in violation of labeling and packaging requirements as described in §§ 3.2-4123 or 3.2-5145.4:1 or inhalants in violation of labeling and packaging requirements as described in § 3.2-4123[contact the Virginia Department of Agriculture and Consumer Services (VDACS) for enforcement guidance]</p>

Policy Notice

June 29, 2023



- Updated submission guidelines for Cannabis offenses
- Clarifies capabilities to support criminal charges involving plant material, oils, extracts, vape cartridges, and edibles
- Announced outsourcing ability for edibles



Cannabis Edibles Update

- DFS will do initial qualitative testing and report identification of cannabinoids present, then make contact to determine if additional analysis is needed and discuss disposition of the evidence
- If evidence is suitable for testing and THC quantitation is needed, DFS will send to NMS Laboratories for quantitation of THC concentration
- 2022-2024 biennial budget included one (1) laboratory specialist position to enable agency response to THC legislation



Forensic Biology Program Update

Brad C. Jenkins

Forensic Biology Program Manager

Examiner/Biologist Trainee Update – Forensic Biology



Central Laboratory:

- 6 in training (1 Mito, 2CW, 3DB)

Western Laboratory:

- 1 in training

Northern Laboratory:

- 2 in training

Eastern Laboratory:

- Fully staffed



New Biologist Positions

- 2 Biologist positions for Central
 - Will be trained to screen Physical Evidence Recovery Kits (PERKs) for male DNA
 - These kits will be sent to Central for testing
 - Generate STR profiles
 - CODIS uploads and searches
 - Issue basic reports
 - Complex reports issued by examiner staff
 - Hope to add to Biologist PERK testing staff in 2024



Staff Internal Training Projects

- True Allele - Training 2 examiners continues
- Future Relationship Stats Training NOVA



Staff Continuing Education

DNA meeting in Fairfax October 2023

2 ½ days of presentations and DFS staff meeting

Thank you Dr. Vallone

Thank you Ms. Schelling



Validation Update

- **Real Time PCR instruments and DNA quantitation kit**
 - Ran some additional samples in the regional labs
- **New Thermal cyclers (being QC'ed currently)**
 - Checking to see if these affect our STRmix settings
- New Y-STR Kit evaluation



Direct Amplification

Reference samples

- Finishing manual updates
- Staff training and competency
- Validation and performance checks for your review next meeting



Outsourced Sexual Assault Kit Testing

SAKI Grant with Virginia Office of the Attorney General

- Pre CODIS kits prior to 1997 and terminated kits 1997-2016
- Approximately 600
- DLI in Florida
- Ownership reviews and CODIS uploads continue

Physical Evidence Program Update

Sabrina S. Cillessen

Physical Evidence Program Manager

Latent Prints & Impressions Staffing



In training:

- 1 in Central for Impressions
- 1 in Western for Impressions

Latent Prints & Impressions

Continuing Education



The Section Meeting was held at the International Association for Identification (IAI) August 2023 Educational Conference in Maryland.

Examiners attended numerous lectures and workshop.

- Are We Part of the Problem, or Part of the Solution?
- "Inconclusive Decisions"-The Achilles Heel of Latent Print Examination
- What to Expect When Training Latent Print Examiners
- What's in a Name? Consistency in Latent Print Examiner's Naming Conventions and Perceptions of Minutiae Frequency
- Latent Print Processing Sequences-Every Step Counts
- Rating the complexity of Fingerprint Comparisons
- Fingertips: Comparing Extreme Distal Impressions
- Contact Distortion: Hand Flexion and Angle of Contact



Latent Prints

- The upgrade to the Virginia State Police Automated Fingerprint Identification System (AFIS) has been delayed due to reconfiguring of the communication network.



Latent Print Report Wording Updates

- Comparison results in a table format at the beginning of the report.

RESULTS AND INTERPRETATIONS:

COMPARISON RESULTS OVERVIEW:

Name	Identification (Total/Item)	Exclusion (Total/Item)	Inconclusive (Total/Item)
John DOE	1 / Item 02	N/A	3 / Item 01
Jane DOE	2 / Item 01	N/A	1 / Item 01

Firearms & Toolmarks Staffing



In recruit:

- 1 in Central
- 1 in Eastern

In training:

- 2 in Eastern
- 1 in Western
- 1 in Central
- 1 in Northern (qualified)

New approach to training with 1 Training Coordinator for all trainees



Firearms & Toolmarks

National Integrated Ballistic Information Network (NIBIN)

As of September 29, 2023 there have been 1039 NIBIN potential associations.

- Western - 180
- Northern - 83
- Eastern - 495
- Central - 281

6 hits been confirmed thus far this year

Firearms & Toolmarks

NIBIN



Local agencies with NIBIN

- Chesapeake
- Fairfax
- Newport News/Hampton (entry & correlation)
- Norfolk
- Richmond
- Virginia Beach
- VSP (Culpeper and Salem)

Digital & Multimedia Evidence Staffing Update



In training:

- 2 in Central



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.

Toxicology Program Update

James W. Hutchings, Ph.D.

Toxicology Program Manager



Toxicology

Methodology - update

- Cannabinoid Quantitation and Confirmation by Supported Liquid Extraction Using LCMSMS
- Xylazine Qualitative Screening
- In progress
 - Nitazenes – in development on the QTOF
 - Xylazine and Dexmedetomidine Quantitation
 - Additions to Miscellaneous Base Drug Quantitation



Staffing

Vacancies

- Toxicology
 - C: 1 Forensic Toxicologist (FT)
 - W: 1 FT
 - E: No vacancies
 - N: 2 FLS, 1 FT, 1 Forensic Scientist (FS)

Breath Alcohol

- No vacancies

Trainees

- Toxicology
 - Central – 1 FT
 - Western – 3 FSs
 - Eastern – 2 FSs
 - Northern – 1 FT

Breath Alcohol

- 1 FS



Grants

Awarded 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

	2021	2022	2023**
OCME*	5484	5139	2798
DUID	2838	2583	1550
DUI	2139	2327	-
DUI+THC	-	-	1474
Tox-Other	705	753	354

*Outsourcing of OCME cases

**Through June 2023



Toxicology – Items of Note

- All DUI/DUID samples are now screened for a tetrahydrocannabinol metabolite and alcohol
- Quantitative: Δ^9 -THC, Δ^9 -carboxy-THC, Δ^9 -hydroxy-THC

NEW:

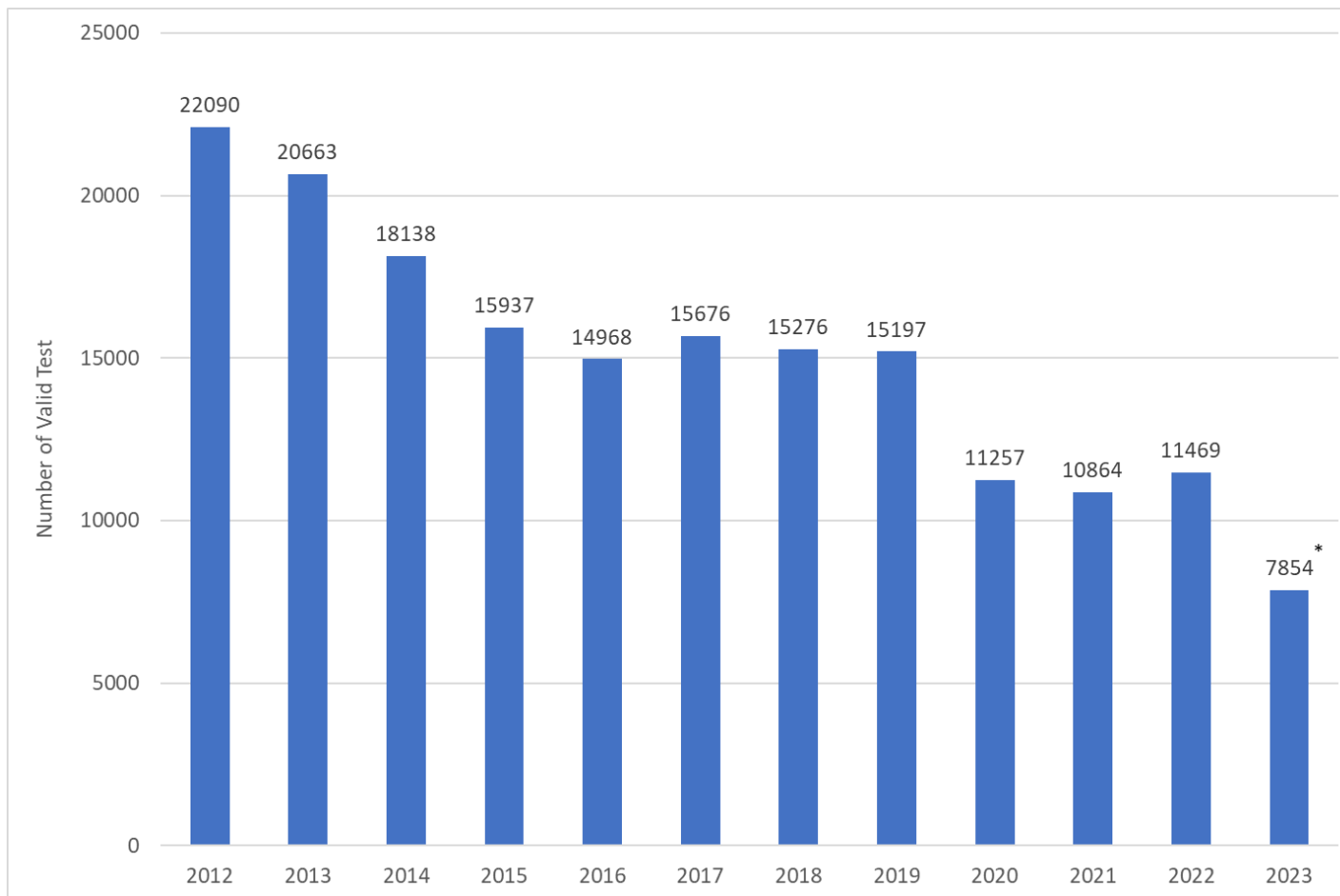
- Qualitative: Δ^8 -THC, Cannabidiol
- Other isomers and compounds will be in future work including Δ^8 -carboxy-THC, Δ^8 -hydroxy-THC, Δ^{10} -THC/ $\Delta^{6a,10a}$ -THC, HHC

- Through Sept. 2023, ~23% of cases with BAC >0.100 % w/v had a quantifiable THC concentration

CY23 (Through Sept. 30)		
	Cases with BAC \geq 0.100% w/v	Cases with BAC <0.100% w/v
Average THC Concentration	0.0053 mg/L	0.0086 mg/L
Median THC Concentration	0.0035 mg/L	0.0045 mg/L



Breath Alcohol Statistics



*January 1- August 31, 2023
Projection to December 31, 2023 = 11781



Breath Alcohol Updates

- New Breath Alcohol Instrument
 - Working with Department of General Services Division of Purchases and Supply to develop bid documentation
 - Anticipate bid being out prior to year end



Thank you!