



VIRGINIA DEPARTMENT OF FORENSIC SCIENCE

EVIDENCE HANDLING & LABORATORY CAPABILITIES GUIDE

TOXICOLOGY

Contact Information

If you have any questions concerning the Toxicology laboratory examination capabilities or evidence handling procedures, please call the Training Section or the Toxicology Section at the Forensic Laboratory that services your area.

<u>Laboratory</u>	<u>Section Contact</u>	<u>Phone Number</u>
Central	Dr. Teresa Gray	(804) 588-4114
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OVERVIEW

The Toxicology Section analyzes blood and other biological samples for the presence of alcohol, drugs and poisons. Types of cases analyzed include DUI/DUID, drug-facilitated sexual assault, death investigations, poisonings and manslaughter cases. In addition, the Toxicology Section includes an alcoholic beverage laboratory.

The Virginia Department of Forensic Science (DFS) supplies DUI/DUID Blood Specimen Collection Kits to law enforcement agencies across the Commonwealth. Historically, all collected samples were mailed to the Central Laboratory in Richmond for testing. Recently, DFS has transitioned to a decentralized DUI/DUID testing program. For each jurisdiction, DFS has designated the regional laboratory to which the agency should mail the Blood Specimen Collection Kits for testing. Testing and testimony will be provided from that DFS regional laboratory. The laboratory designated to receive your Blood Specimen Collection Kits may not be the laboratory to which you submit other forensic evidence. The designation is based upon which laboratory is best able to provide your jurisdiction the timeliest service. Blood Specimen Collection Kits are supplied from DFS with the correctly designated laboratory address on the mailing box.

For cases received on or after January 1, 2014, an Uncertainty of Measurement (UoM) statement appears on the completed Certificate of Analysis (CoA). All measurements have some amount of variation expected within the measurement process. This variation in measurement of alcohol and/or drug concentration has been calculated and will be reported on an attachment to the CoA.

CAPABILITIES AND SERVICES

Volatile compounds (e.g., ethanol, methanol, isopropanol, acetone, etc.)

Drugs of abuse

Over the counter and prescription medications

Miscellaneous (e.g., carbon monoxide, poisoning)

Alcoholic Beverage Content

COLLECTION GUIDELINES

ITEM - DUI/DUID Samples (Collected pursuant to implied consent)

METHOD - Use a DUI/DUID Blood Specimen Collection Kit provided by DFS. This kit includes two gray top blood vials, two Certificates of Blood Withdrawal (CBW), povidone iodine swab to cleanse arm, and evidence seals. Please submit a Request for Laboratory Examination form (RFLE) with the kit indicating suspected intoxicant(s) (alcohol or specific drugs).

Have a physician, registered nurse, licensed practical nurse, phlebotomist, graduate laboratory technician or a technician or nurse designated by order of a circuit court acting upon the recommendation of a licensed physician, use the povidone iodine swab to cleanse the arm and withdraw blood into the two vacutainer tubes provided by DFS (§18.2-268.5). (Figure 1)

The vials shall be sealed by the person taking the sample, or at his/her direction. (Figure 2) The person who seals the vials shall complete the pre-numbered Certificate of Blood Withdrawal forms (CBW) and attach one CBW to each vial. (Figures 3 and 4) The vials shall be placed in a container provided by DFS and the container shall be sealed to prevent tampering with the vials (§18.2-268.6). (Figures 5, 6, 7, and 8) Promptly transport or mail the DUI/DUID container to the designated laboratory address indicated on the mailing box. If the accused is known to have a blood borne disease (HIV/AIDS, Hepatitis B, etc.) the kit must be hand delivered to DFS.



Figure 1: Gray top blood vials filled with blood.



Figure 2: Vials properly sealed using the provided evidence seals.

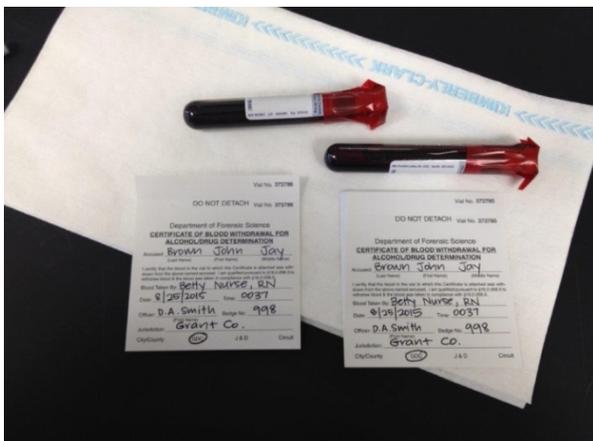
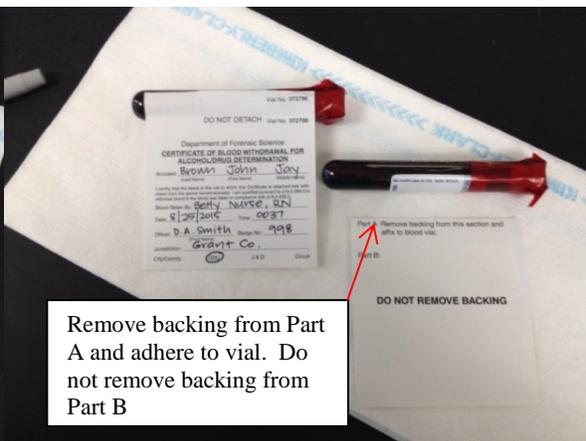


Figure 3: CBWs completed by authorized personnel.



Remove backing from Part A and adhere to vial. Do not remove backing from Part B

Figure 4: CBW properly affixed to left vial. Note: Only small numbered strip (Part A) is affixed to the vial. DO NOT remove entire backing and do not tear the CBW at the perforation.

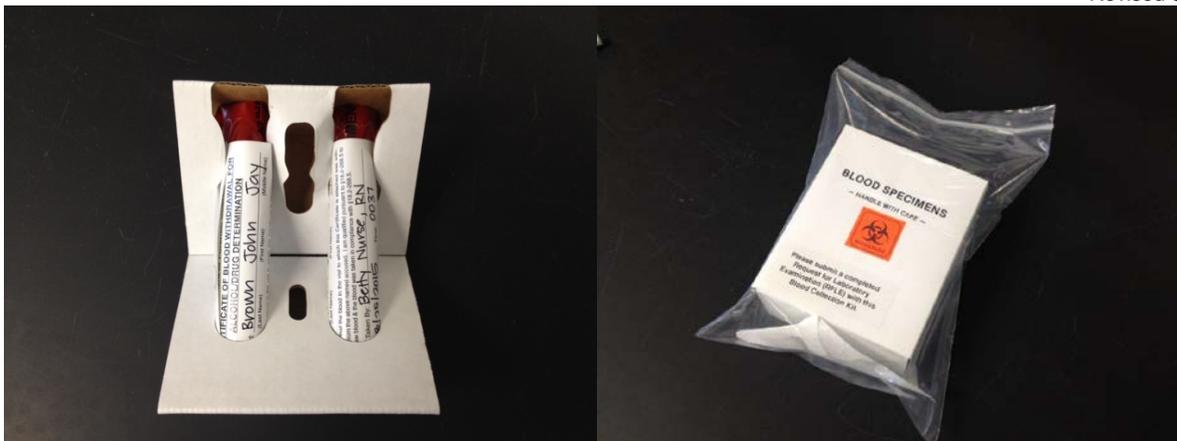


Figure 5: Completed blood vials in specimen holder.



Figure 6: Blood specimen holder with sleeve placed into plastic bag.



Figure 7: Bag with specimens placed into outer container.



Figure 8: Sealed outer container. (Place in mailing envelope marked BIOHAZARD, along with RFLE, and mail to appropriate DFS laboratory)

DISCUSSION - Once the examination is complete, the completed CoA, with the affixed CBW, will be mailed to the clerk of the court in which the charge will be heard (not the submitting or arresting officer). Upon completion of the examination, DFS will preserve the remainder of the blood sample for 90 days. DFS will then destroy the remainder of the blood sample if no notice of or court order to transmit the blood sample to an independent laboratory is received (§[18.2-268.7](#)).

The DFS Toxicology Section uses a protocol (see [Toxicology Procedures Manual](#)) for testing blood samples in implied consent cases. The DUI/DUID protocol is designed to identify alcohol and drugs that can impair driving using 2 levels of testing: alcohol and commonly encountered drugs known to cause impairment. Additional testing may be performed at the discretion of a toxicologist or by request. Once drug and/or alcohol concentrations which may be consistent with impairment have been identified, the testing is stopped and a CoA is generated. If testing is stopped after either Level I or Level II, a statement will appear on the CoA indicating that “No other analyses were performed.”

Level I	Blood Alcohol Testing	
Level II	DUI/DUID Screening Panel (Immunoassay) Including: <ul style="list-style-type: none"> • Cocaine metabolite • Opiates • Oxycodone • Methamphetamine/MDMA • Phencyclidine (PCP) • Barbiturates • Benzodiazepines • Carisoprodol/meprobamate • Fentanyl • Cannabinoids • Methadone • Zolpidem 	Identification/Quantitation of Detected Drugs

Testing Protocol

- Step 1. Level I Blood Alcohol Testing: All samples are analyzed for ethanol.
- a. If ethanol is $\geq 0.100\%$, testing is discontinued and the results are reported.
 - b. If ethanol is $< 0.100\%$, the results are included in the report and the analysis continues with Step 2.
- Step 2. Level II Drug Screening:
- a. If no drug classes are detected, the analysis may continue with Step 4.
 - b. If a drug is tentatively present, the analysis continues with Step 3.
- Step 3. Level II Identification/Quantitation:
- a. If drugs are identified as present at a concentration which may be consistent with impairment, testing is discontinued and the results are reported.
 - b. If no drugs are present, the analysis may continue with Step 4.
 - c. If drugs are identified as present but at a concentration below those consistent with impairment, the results are included in the report and the analysis may continue with Step 4.
- Step 4. A toxicologist may assign additional testing based on case history or request.

Example Report Wording Resulting from Each Scenario

Scenario 1: Blood alcohol level was greater than 0.100%. (Testing was stopped after Level I)

Blood Alcohol Content 0.134% by weight by volume

No other analyses were performed.

See attached document for Uncertainty of Measurement reporting.

Supporting examination documentation is maintained in the case file.

Scenario 2: Blood alcohol level was less than 0.100% and Oxycodone was present and quantified. (Testing was stopped after Level II)

Blood Alcohol Content 0.021% by weight by volume

Oxycodone 0.12 mg/L.

The following substances were not detected:

- Cocaine/Benzoylecgonine
- Methamphetamine/MDMA
- Phencyclidine
- Barbiturates
- Benzodiazepines
- Carisoprodol/Meprobamate
- Fentanyl
- Methadone
- Cannabinoids
- Zolpidem

No other analyses were performed.

See attached document for Uncertainty of Measurement reporting.

Supporting examination documentation is maintained in the case file.

Scenario 3: Blood alcohol content was less than 0.100%, no drugs listed in the screening panel were indicated, additional testing was assigned, diphenhydramine was present and quantified.

Diphenhydramine 0.038 mg/L.

The following substances were not detected:

- Blood Alcohol
- Cocaine/Benzoylecgonine
- Opiates
- Methamphetamine/MDMA
- Phencyclidine
- Barbiturates
- Benzodiazepines

Carisoprodol/Meprobamate
 Fentanyl
 Methadone
 Cannabinoids
 Zolpidem
 Other alkaline-extractable drugs

See attached document for Uncertainty of Measurement reporting.
 Supporting examination documentation is maintained in the case file.

Scenario 4: Blood alcohol content was less than 0.100%, no drugs listed in the screening panel were indicated, additional testing was assigned and no alkaline extractable drugs were indicated.

The following substances were not detected:

Blood Alcohol
 Cocaine/Benzoylecgonine
 Opiates
 Methamphetamine/MDMA
 Phencyclidine
 Barbiturates
 Benzodiazepines
 Carisoprodol/Meprobamate
 Fentanyl
 Methadone
 Cannabinoids
 Zolpidem
 Alkaline extractable drugs

ITEM – Non-implied consent cases (Biological samples collected pursuant to search warrant or means other than implied consent)

Examples of cases include DUI/DUID cases not subject to implied consent, possession of controlled substance, child endangerment, manslaughter, maiming or any other type of offense in which the arresting officer is interested in determining whether or not the suspect had consumed alcohol or drugs.

If the suspect had used or ingested drugs recently (<6 hrs), blood samples would provide the most probative evidence, although a urine sample can also be collected. If more than 6 hours has passed since the suspected time of drug use, then both blood and urine samples should be collected from the suspect.

METHOD - The DUI/DUID kits provided by DFS can be used to collect blood samples. Alternatively, blood, urine or other biological samples can be collected by medical personnel using blood vials and containers provided by the medical facility. When submitting hospital vials and containers, please make sure they are leak proof. Submit a RFLE with the evidence,

including the nature of the offense, manner in which evidence was collected (e.g., search warrant) and types of examinations requested (ethanol or specific drugs).

DISCUSSION - Once the analysis is complete, the evidence and CoA will be returned to the investigating officer.

ITEM - Drug-Facilitated Sexual Assault Cases

In cases of alleged drug-facilitated sexual assault, both blood and urine samples should be collected if the alleged drugging occurred within 24 hours of examination. If alleged drugging occurred more than 24 hours prior to examination, collect and submit urine only.

METHOD - The small purple top blood tube in the Physical Evidence Recovery Kit (PERK) does not provide enough sample for a complete toxicological investigation, so additional blood and urine samples are required. When collecting evidence, request the Sexual Assault Nurse Examiner (SANE) to collect additional blood samples in 2 gray top tubes *and* a urine sample if the sexual assault occurred less than 24 hours prior to examination. If the sexual assault occurred more than 24 hours prior to examination, instruct the SANE nurse to collect a urine sample **only**. Keep these samples separate from the PERK and submit them along with the completed *Questionnaire for Drug-Facilitated Sexual Assault Cases* located inside the PERK to the laboratory as a separate item with a request for toxicological examination.

DISCUSSION - The sooner blood and urine samples are collected after the alleged assault, the greater the chance of detecting drugs that are quickly eliminated from the body if they are present.

ITEM - Alcoholic Beverage

Suspected alcoholic beverages may be submitted to the toxicology laboratory to determine alcohol content. Determination of alcohol content requires at least one ounce of liquid.

METHOD - Submit original container whenever possible. If the original container is open or could potentially leak, transfer at least 1 ounce of liquid to a clean glass screw top bottle prior to submission. If evidence contains multiple samples submit one item from each brand for analysis.

DISCUSSION - Alcohol evaporates easily so make sure evidence is sealed tightly and refrigerate if possible.

ITEM - Poisoning Cases

Poisoning cases are extremely rare and require specific handling and collection. Please contact the Toxicology, Controlled Substances or Trace Evidence Sections for suggestions and instructions on submission of poisoning cases. Items such as empty bottles, partially eaten food, liquid from glasses or other containers, medicinal products, as well as many other possibilities, may be the key piece of evidence in these cases. Depending on the nature and circumstances of the poisoning, evidence may be analyzed by the Toxicology, Trace Evidence and/or Controlled Substances Sections.