

Forensic Toxicology Services Manual

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Mission

The Utah Bureau of Forensic Toxicology (BFT) conducts toxicological analyses, issues written reports of results, and provides expert witness testimony and consultations on matters relative to criminal statutes in the state of Utah. These services are provided to the Office of the Medical Examiner (OME), law enforcement agencies, and other governmental entities involved in criminal matters.

The discipline of Forensic Toxicology involves the analysis of biological samples to determine the presence of drugs and other substances. Typical substances identified include ethanol, marijuana, and prescription drugs. Toxicology analyses are used to:

- Assist the OME in determining cause and manner of death (Utah Code Section 26-4-7);
- Provide information in cases involving automobile homicides (Utah Code Section 76-5-207) or suspects driving under the influence (DUI) of alcohol and/or drugs (Utah Code Section 41-6a-502).

Quality Statement

The Utah Bureau of Forensic Toxicology (BFT) Laboratory will continually strive to meet customer needs by ensuring the quality, reliability, objectivity, and relevance of its laboratory data through the quality system described in this manual.

The quality system applies to all work performed in the laboratory's facility and has been designed to meet the requirements for laboratory accreditation established by the American Board of Forensic Toxicology, the Society of Forensic Toxicologists, and the American Academy of Forensic Sciences.

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Specimen Submission Requirements

Specimen submission requirements are summarized in:

[Appendix A: Quick Reference Guide for Delivering Specimens](#)

[Appendix B: Quick Reference Guide for Mailing Specimens](#)

1. A certified phlebotomists must collect the specimens in accordance with universal safety precautions. To obtain information on certification, contact the Utah Department of Health, Bureau of Emergency Medical Services at 800-284-1131.
2. Specimen Documentation
 - The Toxicology Analysis Request Form must be completed and included with the specimen(s). The current form is available online on the [BFT website](#)¹.
 - The submitting officer is responsible for indicating the tests to be conducted on the specimens. Please limit tests to the suspected drugs or drug categories. Unnecessary additional requests are costly and prevent the laboratory from reporting case results in a timely manner. For more information on the Laboratory's testing services, see [Appendix C: Testing Panels](#).
3. Specimen Containers
 - Blood: The recommended container for blood collection is a 10mL gray top glass blood collection tube containing both a preservative (100 mg sodium fluoride) and an anticoagulant (20 mg potassium oxalate). The preservative helps prevent deterioration of drug in the specimen and the anticoagulant prevents the specimen from clotting.
 - Urine: The recommended container for urine collection is a 60mL plastic urine container. Preservatives are not required.
4. Specimen Volume

| Minimum Specimen Volume Requirements For Testing | |
|--|---------------------------------|
| Blood or urine alcohol | 2 ml |
| Blood drug screen | 20 ml (2 x 10mL gray top tubes) |
| Urine drug screen | 20 ml |

5. Specimen Type
 - Always collect blood for cases involving driving performance and/or impairment.
 - Only collect urine for cases on which the presence of a substance is sufficient (e.g., underage drinking cases, sexual assault cases, etc.).

¹ Website: <http://www.health.utah.gov/lab/toxicology/index.html>

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6. Specimen Labeling

Using water-resistant ink, the specimens must be labeled, at a minimum, with the required information:

- The suspect's first and last name; and
- The agency's case number.

7. Specimen Seals

- A tamper-resistant seal must be placed across the stopper or cap of the specimen container.
- The person sealing the specimen container must initial and date the seal. Identification labels for blood tubes must NOT be used to seal the tube.

8. Specimen Storage

- Specimens should be kept secure and refrigerated until shipped or delivered to the laboratory.

9. Specimen Chain of Custody Information

- Ensure that the chain of custody information at the bottom of the Toxicology Analysis Request Form is completed prior to submitting the sample.
- The "Law Enforcement Chain of Custody Report" (page 2 of the Toxicology Analysis Request Form) is provided for use within the submitting agency. These are to be maintained within the agency and do not get submitted with the specimens.

10. Specimen Submission Methods

- Delivering Specimens to the Laboratory

Each sealed and labeled blood specimen tube must be placed in an envelope or other sealable container. Polyethylene urine containers must be placed in a sealable plastic pouch or other sealable container. These containers must be sealed, initialed, and dated by the person sealing the container.

Specimens can be delivered to the Laboratory through the delivery entrance (North side) during business hours.

- Mailing Specimens to the Laboratory

Each sealed and labeled blood specimen tube must be placed in the cushioned receptacles in the blood collection kit. Polyethylene urine containers must be placed in the sealable plastic pouches in the urine collection kits. These containers must contain sufficient absorbent material to absorb the entire liquid contents of the collection tube/container in the event of breakage/leaking during transit. These containers must be sealed, initialed, and dated by the person sealing the container.

These containers must then be placed in a crush-proof shipping container made of cardboard. These outer containers must be sealed, initialed, and dated by the person

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sealing the container. If not pre-printed on the cardboard container, biohazard labels must be affixed to the exterior.

Mailed specimens must meet blood borne pathogen shipping requirements and be packaged to fully contain leakage/spillage in accordance with applicable federal laws (PHS 42 CFR Part 72, rule 173.199). These measures are necessary to protect your agency personnel, postal/delivery personnel, and laboratory staff from exposure to disease in the event that the specimen tubes leak or break in transit. Specimens that have leaked will be returned to the submitting agency.

Analytical Results

1. The BFT Laboratory issues final reports to the submitting law enforcement officer electronically by email or fax. Please ensure that reports are distributed in a timely manner to all other involved parties (e.g., records department, prosecutor's office, etc.).
2. When final reports are not available, preliminary reports may be issued to the Driver License Division and will be available to officers at the driver license hearing. Please do not request additional preliminary reports be issued to you separately. Note that preliminary reports provide only presumptive results and these results may not be confirmed upon further testing.

Specimen Return

1. Specimens are retained in the laboratory's evidence refrigerator for a maximum of 8 weeks after the final report is issued. Should an agency require additional testing, the request must be made during this time period.
2. After the 8 week storage period, specimens are repackaged and returned to the submitting agency.

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Appendix A: Quick Reference Guide for Delivering Specimens

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Instructions for Delivering Blood Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases).
- For any questions, call (801) 965-2451.



Collect 2 samples in 10mL glass grey top tubes. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal tubes. Initial and date the seals.



Insert tubes in an envelope. We recommend including an absorbent pad and using a padded envelope. Absorbent pad must be of sufficient size to absorb any leakage of tube contents. Use evidence tape to seal the envelope. Initial and date the seal.

Enter all information on the current Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number. The current form is available online at:
www.health.utah.gov/lab/toxicology

Deliver the samples to the laboratory and collect chain of custody sample receipt for all samples.

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Instructions for Delivering Urine Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases).
- For any questions, call (801) 965-2451.



Collect 30mL of urine and tightly cap the container. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal container. Initial and date the seals.



Insert urine container and absorbent pad into secondary container. Absorbent pad must be of sufficient size to absorb any leakage of container contents. Seal the secondary container. Initial and date the seal.

Enter all information on the current Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number. The current form is available online at: www.health.utah.gov/lab/toxicology

Deliver the samples to the laboratory and collect chain of custody sample receipt for each sample. For questions on this procedure, call: (801) 965-2451

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Appendix B: Quick Reference Guide for Mailing Specimens

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Instructions for Mailing Blood Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases, sexual assault cases).
- For any questions, call (801) 965-2451.



Collect 2 samples in 10mL glass grey top tubes. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal tubes. Initial and date the seals.

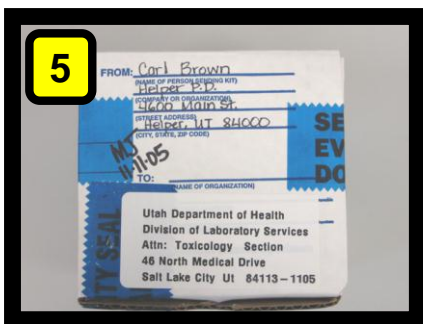


Insert tubes and absorbent pad in a secondary container. Absorbent pad must be of sufficient size to absorb any leakage of tube contents. Secondary container must be crushproof to 17psi.

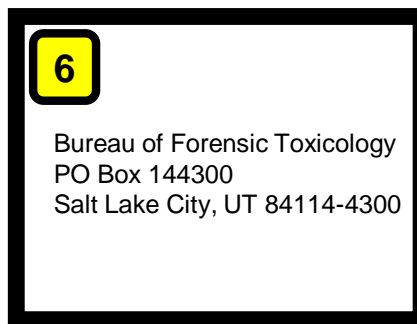


Cap the secondary container. Use evidence tape to seal the container. Initial and date the seals.

Enter all information on the Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number.



Insert secondary container and request form into shipping box. Use evidence tape to seal the box. Initial and date the seals.



Ensure mailing address and return address are on the box and send to the laboratory.

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Instructions for Mailing Urine Specimens to the Toxicology Laboratory

- Always collect blood for cases involving driving performance and/or impairment.
- Only collect urine for cases on which the presence of a substance is sufficient (for example: underage drinking cases, sexual assault cases).
- For any questions, call (801) 965-2451.



Collect 30mL of urine and tightly cap the container. Label each tube with suspect's First and Last Name and your agency case #. Use evidence tape to seal container. Initial and date the seals.

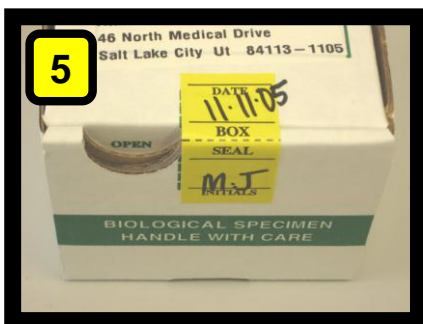


Insert urine container and absorbent pad into secondary container. Absorbent pad must be of sufficient size to absorb any leakage of container contents. Seal the secondary container. Initial and date the seal.

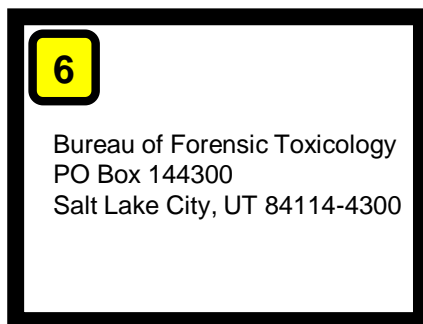
Enter all information on the Toxicology Request Form. Ensure that both the tubes and the form have exactly the same suspect name and agency case number.



Insert secondary container and request form into shipping box.



Use evidence tape to seal the box. Initial and date the seals.



Ensure mailing address and return address are on the box and send to the laboratory.

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Appendix C: Testing Panels

Following is a list of all the drugs included in our testing panels. The BFT services are subject to change depending on resources and/or changing customer needs.

For drugs not included in the BFT testing panels above, specimens may be sent to a reference laboratory at the expense of the submitting agency. When requesting reference laboratory testing, please provide a PO number to cover the cost of analysis and shipping and handling.

1. Volatiles Panel

| Volatiles Panel | | | | | |
|----------------------------|-------------------------|--|-------|-------------------------|-------|
| Method: HS/GC ⁱ | | | | | |
| Drug Class | Drugs | Reporting Limits (grams/100ml or %) | | General Detection Times | |
| | | Blood | Urine | Blood | Urine |
| Volatiles | Ethanol | 0.01 | 0.01 | 3-12 hours | |
| | Acetone | 0.02 | 0.02 | n/a | n/a |
| | Isopropanol Methanol | | | | |

- **Unless there are extenuating circumstances, no further testing is conducted on specimens resulting in blood ethanol > 0.10 grams/100ml.**

2. Drugs of Abuse Panel

| Drugs of Abuse Panel | | | | | |
|---|----------------------------------|---|----------|---|-----------------------|
| Methods: ELISA ⁱⁱ , GC/MS ⁱⁱⁱ | | | | | |
| Drug Class | Drugs | Reporting Limits (micrograms per milliliter) | | General Detection Times | |
| | | Blood | Urine | Blood | Urine |
| Amines | Amphetamine | 0.05 | 0.10 | 1 - 3 days | 3 - 5 days |
| | Methamphetamine | | | | |
| | MDA | | | | |
| | MDMA | | | | |
| Cannabinoids (Marijuana) | THC | 2 ng/ml | N/A | 1-6 hours depending on frequency of use | Not found in urine |
| | THC-COOH (metabolite) | 5 ng/ml | 15 ng/ml | | |
| Cocaine | Cocaine | 0.05 | 0.10 | 5 hours | 12 hours |
| | Benzoyllecgonine (metabolite) | | | varies | 2 - 4 days |
| Opiates | Morphine | | | 1 - 4 hours | 3 - 4 days |
| | | | | | |

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3. Rx Panel

| Prescription Drug and OTC Drug Panel | | | | | |
|--|--|---|-------------------------|--|-------|
| Method: LC/MS/MS-TOF ^{IV} , GC/MS | | | | | |
| | Drugs | Reporting Limits (micrograms per milliliter) | | General Detection Times | |
| | | Blood | Urine | Blood | Urine |
| Multiple Drug Classes | Alprazolam (e.g., Xanax) | 0.025 | Positive or Negative | In general, prescription and over-the-counter drugs can be detected in blood within 4-24 hours, and in urine for 2-4 days. | |
| | Amitriptyline: (Elavil) | 0.025 | | | |
| | Butalbital (Fioricet) | 2 | | | |
| | Carbamazepine (e.g., Tegretol) | 2 | | | |
| | Carisoprodol (Soma) | 2 | | | |
| | Chlorpheniramine (e.g., Chlor-trimeton, Triaminic) | 0.025 | | | |
| | Codeine (Brontex) | 0.025 | | | |
| | Cyclobenzaprine (Flexeril) | 0.025 | | | |
| | Dextromethorphan (e.g., in Robitussin) | 0.025 | | | |
| | Diazepam (e.g., Valium) | 0.025 | | | |
| | Diphenhydramine (Nytol, Sleep Aid) | 0.025 | | | |
| | Doxylamine (e.g., Unisom) | 0.025 | | | |
| | Hydrocodone (e.g., Lortab) | 0.025 | | | |
| | Meperidine (Demerol) | 0.05 | | | |
| | Meprobamate | 2 | | | |
| | Methadone (Methadose) | 0.025 | | | |
| | Nordiazepam | 0.025 | | | |
| | Nortriptyline (Aventil, Pamelor) | 0.025 | | | |
| | Oxycodone | 0.025 | | | |

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| | | | | |
|--|-----------------------------------|-------|--|--|
| | Phenobarbital (e.g., Luminal): | 2 | | |
| | Phenytoin | 2 | | |
| | Promethazine (e.g., Phenergan) | 0.05 | | |
| | Tramadol (Ultram) | 0.025 | | |
| | Trazodone (Desyrel) | 0.025 | | |
| | Zolpidem (Ambien) | 0.025 | | |

ⁱ Headspace Gas Chromatography

ⁱⁱ Enzyme Linked Immunosorbent Assay

ⁱⁱⁱ Gas Chromatography/Mass Spectrometer

^{iv} Liquid Chromatography Tandem Mass Spectrometer