

Tennessee Bureau of Investigation

EVIDENCE GUIDE



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Director

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SPECIAL NOTICE

****Accreditation****

When submitting evidence to the TBI Laboratory, submitters acknowledge the following:

- TBI Examiners will choose appropriate technical processes to address the submitter's request for examination.
- Depending on the caseload of the laboratory and the needs of the customer, evidence examinations may be contracted and/or subcontracted to another laboratory.
- A TBI Laboratory Report of Examination may contain the opinions and/or the interpretations of the examiner(s) who issued the report.

Evidence Seals

All evidence submitted to a Tennessee Bureau of Investigation Crime Laboratory **must** be in a container that is sealed. The only seals that will be accepted are:

- Tape running the entire width of the opening of the package
- Heat-sealed packages
- Packages with *Tamper-proof* Seals

All evidence seals must be initialed by the person sealing the package or placing a seal on the package.

If you are sealing the package with tape, the initials, date and time should overlap the taped seal and the package – so that your markings are on both.

For tamper-proof packages, the initials must be **on** the seal. For heat-sealed packages, the initials must be as close as possible to the seal.

Evidence that does not meet the sealing requirements cannot be accepted for analysis by a Tennessee Bureau of Investigation Crime Laboratory.

If it is not practical to package a piece of evidence (such as, an entire vehicle), the officer or technician submitting that evidence should securely attach a tag to the evidence and initial the tag.

All evidence containers/packages must be sealed to the extent that nothing can be added to or removed from the container/package.

General Evidence Collection Supplies

General Evidence Collection Supplies include, but are not limited to:

Biohazard bags and containers
Camera and accessories
Complete fingerprint kit including: lift tape, cards, brushes, and powder
Cotton swabs
Cotton work gloves
Coveralls
Crime scene tape
Directional compass
Disassembly tools
Drywall knife
Dust masks
Envelopes (small, large, business, 9" x 12" manila)
Evidence sealing tape
Box of flares
Flashlight and extra batteries
Graph paper
Legal-sized clipboard
Location markers
Magnifying glass
Measuring tape
Mylar, clear sheets (8 1/2" x 10")
Paper bags and cardboard boxes (small, medium, large)
Pens, pencils, and permanent markers
Pocket knife (multi-tool)
Protective footwear
Protective glasses (safety glasses)
Roll of cotton batting
Roll of string
Rubber gloves
Saws
Scissors
Small and large trash bags
Small shovel
Stapler and staples
Tape
Trajectory Rods
Unused paint cans
Ziploc bags

Where to Submit Evidence and Services Offered

Submit Evidence to the Laboratory Serving Your Area:

Nashville Crime Laboratory
901 R.S. Gass Blvd.
Nashville, Tennessee 37216-2639

Special Agent, Forensic Scientist Mike Lyttle, Regional Crime Laboratory Supervisor
(615)744-4488

Firearm and Toolmark Identification, Forensic Chemistry, Latent Prints, Microanalysis,
Forensic Biology, Toxicology, Breath Alcohol

Knoxville Crime Laboratory
1791 Neals Commerce Lane
Knoxville, Tennessee 37914

Special Agent, Forensic Scientist Kelvin Woodby, Regional Crime Laboratory Supervisor
(865) 549-7870

Forensic Chemistry, Forensic Biology, Toxicology, Breath Alcohol

Memphis Crime Laboratory
6325 Haley Road
Memphis, Tennessee 38134

Special Agent, Forensic Scientist Donna Nelson, Regional Crime Laboratory Supervisor
(901) 379-3457

Firearm and Toolmark Identification, Forensic Chemistry, Forensic Biology, Toxicology,
Breath Alcohol

Should you have a question about which laboratory handles your evidence, please call any of the above laboratories for assistance prior to submission of the evidence.

TBI Violent Crime Response Team Program

Questions that will be asked prior to dispatching the TBI Violent Crime Response Team:

- Is it a homicide crime scene?
- Has the crime scene been preserved and secured?
- Has any processing already been performed?
- What processing is needed?
- What are the reasons for needing a crime scene team?
- Have you contacted the TBI Agent assigned to your county?

Each time the Violent Crime Response Team is dispatched to a crime scene, valuable laboratory analysis time is lost. Therefore, the Violent Crime Response Team can only respond to the most violent, heinous homicide crime scenes in the state.

Recommended steps for preserving the Crime Scene

It is recommended that the following measures be taken as soon as possible:

- Tape off a generous perimeter and post officers to provide security for the scene.
- Begin a Perimeter Log requiring anyone who enters the Crime Scene to record the following information:
 - Name
 - Rank
 - Date
 - Time In
 - Time Out
 - Purpose
- Limit access to the absolute minimum people, for example:
 - Don't unnecessarily walk through the crime scene.
 - Don't smoke, eat or drink within the crime scene.
 - Don't use the bathroom facilities within the crime scene.
 - Don't use the telephone within the crime scene.
 - Don't allow items to be removed from the crime scene.

TBI Violent Crime Response Team Program

Each Violent Crime Response Team consists of Forensic Specialists with expertise in Latent Prints, Firearm & Toolmark Identification, Forensic Biology and Microanalysis. This Team has access to a specially designed and outfitted vehicle containing all necessary supplies and equipment for safe and thorough crime scene processing.

Recommended steps for preserving the Crime Scene:

It is recommended that the following measures be taken as soon as possible:

- A. Tape off a generous perimeter and post Officers to provide security for the scene.
- B. Begin a Perimeter Log requiring anyone who enters the Crime Scene to record the following information:
 1. Name
 2. Rank
 3. Date
 4. Time In
 5. Time Out
 6. Purpose
- C. Limit access to the absolute minimum possible.

Once the decision to utilize the Violent Crime Response Team has been approved, a certain amount of time will be required for the Team to respond. (This includes notification of Team Members, travel time to the assembly point, assembling all necessary gear and equipment, and travel time to the Crime Scene.)

During this time interval, should the Investigator at the Crime Scene feel that transient physical evidence is in jeopardy due to: wind, rain, temperature change, etc., these conditions may require the Investigator to take steps to protect the integrity of the evidence.

In this event, it is recommended that the Investigator contact the Leader of the Violent Crime Response Team who will give his or her recommendation as to the most effective way to protect the evidence until the Team arrives.

Please call the Tennessee Information Enforcement System Network Operation Center (T.I.E.S.N.O.C.) at (615) 744-4600 for assistance.

Capabilities of TBI Violent Crime Response Team

General: Documentation of the Crime Scene

- A. Notes:** The VCRT will produce a detailed narrative of all activities from the time they are first contacted until they have secured the evidence in the Crime Laboratory. These notes may include, such details as:
1. Weather, temperature, lighting
 2. Verbal description of the scene and as many details as possible regarding it
 3. Chronology and detailed account of all activities conducted by the Team
 4. Results of Vehicle Inventory Searches
 5. Results of Inventory Search of Victim's clothing and personal effects
- B. Videotape:** Team will typically produce a detailed video portrayal of:
1. The general location and exterior of the Crime Scene
 2. Areas of possible entry and exit
 3. Each room of the residence and its contents
 4. In-depth documentation of the victim, his/her position, wounds, etc.
 5. All items of evidence as they appeared when located, complete with marker number and scale
- C. Photography:** Team will typically produce a detailed digital portrayal of:
1. Location Photos – an overlapping series of photos depicting the overall scene, residence, or terrain
 2. Witness Photos – Long to intermediate range photos depicting areas of possible entry and exit, all rooms from multiple angles, victim from multiple angles, photos from witnesses vantage point, photos showing spatial relationships of items of evidence to one another and to victim, etc.
 3. Close-ups – Photos depicting wounds, gags, ligatures, etc.
 4. Evidence Photos – Close range photos depicting each item of evidence as it appeared when located, complete with marker number and scale in the frame
 5. Other – Available light, painting with light, laser photography, and other special techniques as required
- D. Measuring:** The dimensions of the residence and its rooms, as well as, the distances between any landmarks within the scene, will typically be recorded. Each significant item within the Crime Scene will typically be measured to a minimum of two fixed, permanent reference points (if none are available, the Team will create suitable reference points). The height of any item of evidence other than 0" will typically be recorded. Measurements will be made using at least one of the following methods:
1. Triangulation method
 2. Rectangular coordinate method
 3. Baseline-offset rectangular coordinate method
 4. Leica Scanstation

E. Diagramming: Team can produce a detailed, measured diagram of the crime scene depicting the floor plan and the spatial relationship of items of evidence to one another, to the victim, and to reference points. It will include:

1. A compass heading
2. A description of the area depicted
3. The date and time
4. The initials of the person completing the diagram
5. The initials of any measuring assistant

The diagram can be produced using one or more of the following methods:

1. Bird's Eye method – showing the floor plan from above
2. Cross Projection method – showing a fold-down or exploded view from above
3. Perspective view
4. Cut-Away view

F. Collection: Each item of evidence will be packaged in the proper type of container and will be labeled with:

1. Initials of the team member collecting it
2. Description of the item of evidence
3. Description of where it was located
4. Date and time it was collected

In addition, an Evidence Log will be produced which records for each item of evidence collected:

1. Exhibit Number
2. Item Number
3. Marker Number
4. Location of each item
5. Description of each item
6. Date and time of collection
7. Name of the team member collecting it

Results Generated for Each Crime Scene Processed:

- A. Copy of Request for Technical Assistance Memo,
- B. Copy of completed Laboratory Submittal Form,
- C. Copy of completed Evidence Log,
- D. Copy of detailed Crime Scene Narrative,
- E. Copy of all finished Diagrams and Measurements,
- F. Copy of Crime Scene Photos, and
- G. Copy of Crime Scene Video

Discipline-Specific Capabilities of the Latent Print Specialist

- A. Locating evidence:** The Latent Print Specialist can locate evidence, such as, fingerprints, palm prints, footprints, or prints caused by contact with other body parts using one of the following methods:
1. Visual search for latent prints, patent (visible) prints, or plastic (impressed) prints at points of entry, exit, and any suspected areas of contact,
 2. Use of a Krimesite Scope to assist in the location of latent prints, or
 3. Use of the ALS (Alternate Light Source) to assist in the location of latent prints.
- B. Enhancing Evidence:** One or more of the following methods may be employed to enhance the viability of a latent print:
1. CBC (cyanoacrylate) Fuming
 2. Fluorescent Dyes/ALS
 3. Coomassie Blue
 4. Amido Black
 5. Ninhydrin
 6. SPR (Small Particle Reagent)
 7. RUVIS
 8. Dusting with latent print powder or magnetic powder
- C. Documenting Evidence:** Latent Print Evidence is typically documented via:
1. Notes: A detailed record is maintained for the location of each print collected. Areas that have been processed yielding no latent prints will be recorded, as well.
 2. Photography: Latent Prints will often be photographed prior to lifting as a failsafe measure in case the lift is unsuccessful.
 3. Lifts: Latent Prints can be lifted for collection and documentation.
- D. Collecting Evidence:** Items may be brought to the TBI Crime Laboratory for further processing.

The victim may be printed by the Latent Print Specialist for identification purposes.

Discipline-Specific Capabilities of the Forensic Biology Specialist

- A. Locating evidence:** The Forensic Biology Specialist can locate biological evidence at the Crime Scene using one of the following methods:
1. Visual search for RBS (reddish brown stain) at the scene and on potential evidence,
 2. Presumptive chemical tests (phenolphthalein and tetramethylbenzidine) to determine whether an RBS is to be collected or discarded,
 3. Use of ALS (Alternate Light Source) for locating possible semen stains, or
 4. Use of Bluestar® chemiluminescence for locating areas containing trace amounts of possible blood when it is suspected that an attempt has been made to clean up a Crime Scene.

Notify Crime Scene Team in advance if Bluestar® is required

- B. Documenting Evidence:** The Forensic Biology Specialist can provide thorough documentation of the location of any areas which have tested:
1. Positive for Presumptive Chemical Test,
 2. Negative for Presumptive Chemical Test,
 3. Positive for Bluestar® chemiluminescence,
 4. Negative for Bluestar® chemiluminescence,
 5. Positive for ALS illumination, or
 6. Negative for ALS illumination
- C. Collecting Evidence:** The Forensic Biology Specialist can collect and properly preserve for analysis:
1. Swabs or cuttings of RBS area(s) positive for presumptive chemical test,
 2. Items of evidence with RBS positive for presumptive chemical test,
 3. Items of evidence which are a possible source of semen,
 4. Items of evidence which are a possible source of saliva (cigarette butts, cans, bottles, etc.), or
 5. Swabs taken for reference standards at the scene (when appropriate).

Discipline-Specific Capabilities of the Firearm & Toolmark Identification Specialist

- A. Locating evidence:** The Firearm & Toolmark Specialist can locate evidence at the Crime Scene in the following ways:
1. Checking for signs of forced entry which can produce possible identifiable toolmarks, such as:
 - a. Impressed Toolmarks – the result of prying, striking, or other direct pressure,
 - b. Striated Toolmarks – the result of sliding contact from a tool, and
 - c. If toolmarks are located, they will be collected whenever practical. If it is impractical to collect the toolmark, a cast of the toolmark will be produced and collected.
 2. Sodium Rhodizonate Test – a chemical test producing a color change for lead residues – such as bullet wipe,
 3. Metal Detectors – the Firearm & Toolmark Specialist may select the type of detector best suited to the task at hand.
 4. Sifting Screen – when it is necessary to search dirt or mud,
 5. The Firearm & Toolmark Specialist has the ability to recognize unusual ammunition components (sabots, fillers, wads, flechettes, etc.) and to identify them by their proper terminology to avoid confusion later).
- B. Documenting Evidence:** The Firearm & Toolmark Specialist can provide thorough documentation of:
1. The location of items of evidence within the crime scene, such as:
 - a. Firearms,
 - b. Ammunition Components – bullets, cartridge cases, shotshell cases, etc,
 - c. Live ammunition, or
 - d. Projectile impact points.
 2. Trajectory – the determination of the projectile’s path when it has struck:
 - a. At least two fixed points of impact (3-dimensional/3-D)
 - b. Special circumstances involved in a vehicle shooting,
 - c. One plane of impact (2-dimensional/2-D) requiring trigonometric calculation,
 - d. May possibly provide a preliminary estimation of the distance from which a shot pattern was fired, or
 - e. Capability to illustrate the bullet path photographically using:
 1. Probes,
 2. Yarn, or
 3. Laser photography
- C. Firearms at the Crime Scene:** By properly documenting and safely unloading these firearms, the Firearm & Toolmark Specialist may, in some cases, be able to determine the sequence of shots fired.

- D. Collection of Evidence:** The Firearm & Toolmark Specialist can collect evidence such as:
1. Embedded projectiles requiring:
 - a. Proper use of hammer and chisel to avoid damaging the projectile,
 - b. Use of a rotozip or reciprocating saw, or
 - c. Use of a sifting screen.
 2. Collection of submerged firearms – by properly packaging a submerged firearm, further corrosion of such a firearm can be kept to a minimum, or
 3. Recovery of victims' clothing – under normal circumstances, this will be done by the medical examiner. In some rare instances, it may be advantageous for the Firearm & Toolmark Specialist to collect them at the scene for muzzle-to-garment distance determination.
- E. Interpretation of Evidence:** When the caliber of a fired, evidentiary bullet is not in question, the Firearm & Toolmark Specialist may be able to consult a General Rifling Characteristics File and provide a list of possible types of firearms which may have fired it.

Discipline-Specific Capabilities of the Microanalysis Specialist

- A. Locating Evidence:** The Microanalysis Specialist can locate trace evidence at the crime scene using one of the following methods:
1. Visual search for 3-D shoe impressions or tire impressions in mud, dirt, snow, etc,
 2. Visual search for 2-D shoe impressions in dust or in blood using oblique lighting, etc,
 3. Search for paint chips, glass, plastic fragments, etc. at a hit-and-run scene, or
 4. Examination of the suspect's vehicle for evidence transferred from the victim.
- B. Enhancing Evidence:** The Microanalysis Specialist can, in certain instances, improve the viability of evidence by one of the following methods:
1. Amido Black or Leuco Crystal Violet reagent to enhance shoe impressions in blood, or
 2. Use of various lighting techniques to improve the contrast of shoe or tire impressions.
- C. Documenting Evidence:** The Microanalysis Specialist can:
1. Use photographic techniques to record 3-D shoe impressions, 2-D shoe impressions, or tire impressions prior to collection, or,
 2. Properly measure and diagram a wheel base and turning radius of tire tracks at the scene for comparison to a known vehicle wheel base and turning radius.
- D. Collecting Evidence:** The Microanalysis Specialist can use the following techniques or equipment to collect evidence:
1. Electrostatic Lifter or Gel Lifter to collect shoe impressions in dust, or
 2. Dental stone to cast shoe or tire impressions in mud, dirt, snow, etc,
 3. Latent lifts of dusted shoe impressions,
 4. Use of vacuum technique or tape lifts to collect hair or fiber evidence,
 5. Collection of glass evidence for:
 - a. Comparison to another sample or standard
 - b. Fracture match
 - c. Analysis of direction of force,
 - d. Order of breakage.
 6. Collection of possible fracture match evidence, such as:
 - a. Paint chips
 - b. Torn paper
 - c. Glass
 - d. Tape
 - e. Automobile parts
 - f. Broken tools, etc.
 7. Collection of unknown substances for analysis or comparison,
 8. Collection of fire debris for ignitable liquid residue analysis, or
 9. Collection of gunshot residue by:

- a. GSR Kit from subject's hands, or
- b. GSR Adhesive stubs from surfaces other than hands.

E. Collecting Standards for Comparison: The Microanalysis Specialist can collect the following standards when appropriate:

- 1. Subject or Victim hair standards,
- 2. Fiber standards,
- 3. Elimination shoeprints,
- 4. Paint standards,
- 5. Glass standards,
- 6. Ignitable liquid standards, or
- 7. Printing of suspect vehicle tires.

Evidence Receiving

Evidence Receiving Units in the Tennessee Bureau of Investigation (TBI) Crime Laboratories will ensure proper evidence flow and tracking. The Evidence Receiving Units receive, distribute, and return all evidence processed by the TBI Laboratory.

Forensic Technicians receive evidence submitted to the laboratory and deliver it to the appropriate laboratory forensic scientist(s) after logging the case information into the Laboratory's Information Management System (LIMS).

Generally, the submitting officer will not meet directly with the forensic scientist(s) who will conduct the analysis. Exceptions to this practice may be made for individual cases when circumstances require the submitting officer to talk directly with the forensic scientist(s). If you feel you have a special need to discuss certain aspects of your case, you may request such a meeting with the forensic scientist(s).

Evidence Acceptance Policy

The TBI Laboratory accepts any evidence from Law Enforcement Agencies or Medical Examiners, which meet the following criteria:

- The evidence has been obtained as the result of an official criminal investigation.
- The TBI will not perform toxicology analysis on any Medical Examiner cases that are non-criminal in nature. The Bureau will only be able to perform analyses on criminal cases that have a law enforcement agency case number, or at the request of the appropriate District Attorney General.
- The investigating officer intends to pursue a criminal case pending the results of evidence analysis and/or the related investigation or prior approval has been requested and received from the TBI Assistant Director of the Forensic Services Division
- The evidence has not been previously examined by another forensic scientist, unless prior approval has been requested and received from the TBI Assistant Director of the Forensic Services Division.

Evidence Submission Procedures

Drug evidence greater than five (5) pounds must be hand-delivered to the respective crime laboratory. All other criminal evidence types normally mailed – including TBI evidence collection kits, such as Blood Alcohol/Toxicology, DNA, Sexual Assault Evidence Collection, Buccal Swab Collection, or Gunshot Residue Kits – will only be accepted if properly packaged and received from a commercial carrier that provides transfer documentation, such as, the US Postal Service Registered and Express Mail, UPS, Federal Express, etc.

Personal delivery of evidence is the preferred method for any perishable evidence, evidence of significant monetary value, firearms, and large quantities of controlled substances.

Adherence to proper evidence submission procedures is essential for forensic scientists to evaluate evidence properly, to maintain the chain of custody, and to maintain the physical integrity and evidentiary value of submitted items. Failure to follow the laboratory's instructions when submitting evidence could result in the evidence being returned.

Should you have any questions as to the proper evidence submission procedures, it is recommended that you contact the laboratory serving your area.

Request for Examination Submission Forms

- Fill out the form in its entirety, supplying all information requested, including: agency case number, date of offense, type of offense, where the evidence was found, the type of evidence, any background information, what type of testing needs to be completed, how to best contact you if there are questions, etc. (See below for more details)
- Don't forget to sign your form.

The chain of custody of each piece of evidence submitted must be tracked while in the possession of the laboratory; therefore, do NOT use a separate page for the itemization of evidence which is part of the same case. Either type the form or print it legibly.

Once the Request for Examination (RFE) form has been completed, place it in a separate envelope and attach it to the outside of the package if you intend to mail it. For in-person submission, the RFE form may be attached to the package itself.

Please contact the laboratory serving your area for additional TBI collection kits.

Instructions for completing the Request for Examination form include:

1. **Requesting Officer:** Please use the same officer for all submission within a single case. This simplifies keeping case records together, as well as, grouping submissions on the laboratory report. The laboratory always returns evidence to the originating agency unless otherwise noted on the Request for Examination form.

2. **TBI Lab Number:** If evidence has previously been submitted in a case and you know the laboratory number, please provide that number to the forensic technician receiving the case by checking the Yes box where it asks, "Has other evidence been submitted on this case?" and fill in the Laboratory number. If you do not know the specific number, please advise the forensic technician that other evidence has been submitted in the case.
3. **Race/Sex/DOB:** Provide this information for all suspects and victims as it is valuable in several kinds of laboratory analyses.
4. **Examination Requested:** Be as specific as possible. If you are not sure of what tests may be performed, please call the laboratory prior to completing the form, or refer to the appropriate sections of this guide for further information. Clearly state the analysis you need performed on each item of evidence. Clarify the request, if you necessary, stating what you need to know from the analysis on the bottom of the form or on a separate sheet of paper.
5. **Where recovered:** Give the exact location where the evidence was seized/collected [i.e. victim (name), subject (name), bedroom, vehicle, etc.]. Failure to properly indicate where evidence was collected may result in its inability to be placed in systems – such as CODIS, or in evidence not being worked.

Note: For the safety of all who might handle evidence, always indicate when evidence was recovered or seized from a body cavity or contaminated area.

6. **Disposition of evidence:** Evidence cannot be store at the laboratory; therefore, once the laboratory report has been released from the lab, evidence *MUST* be picked up by the submitting agency within 30 days.

7. **Statement of Facts:** Briefly describe on the submission form what happened. Supply sufficient detail to illustrate how the evidence submitted relates to the investigation. A copy of your investigative report may suffice if it contains that information. Be sure to specify why you are submitting each item so that the forensic scientists my conduct the appropriate examinations.

Evidence Packaging:

- Package and seal each item individually, as appropriate, for that type of evidence. Make sure that your agency name and case number is placed on the outer packaging. See specific sections of this guide for more detailed instructions. One basic rule of evidence packaging is:

Do not use plastic bags for bloody clothing or plant material that has not been dried. Evidence will not be accepted if it is improperly packaged.

- Mark each item with the item number you listed on the Request for Examination form, your name or initials, and your case number. Complex item numbers – which include both letters and numbers (e.g. FRM-1-360) create tracking problems within the laboratory, and this should be avoided if at all possible. Please try to limit item numbers to simple numbers that run in numerical order.
- Seal and package evidence with protective padding to prevent breakage, leakage, cross-contamination or deterioration. Note: An evidence package is considered sealed only if its contents cannot readily escape and if entering the container results in obvious damage/alteration to the seal. Ziploc seals are not proper seals and must, also, be taped. **Do not use staples.**
- Do not allow submission forms, packages or other cases you may be transporting to become contaminated by biological or other potentially hazardous evidence. Keep all submission documents and other evidence away from contaminated evidence when preparing evidence for submission to the laboratory or transporting evidence to the lab. For safety reasons, stained submission documents will not be accepted by the laboratory.

Single-Section Cases:

- When possible, place all sealed items that will be processed by a single laboratory section into one container (e.g. envelope, bag, box) and seal that container completely. For example, in a drug case involving four separate items, seal each item individually and then place it together with the other three items into one large container. Identify the container as to what items are inside by labeling the inner and other packaging.

Multi-Section Cases:

- If you submit numerous items in a case for examination by separate sections of the laboratory, divide the items into sealed containers according to the laboratory sections that will receive the evidence. This helps to maintain the chain of custody, as persons in the chain but not involved in evidence analysis, need not open and mark each individual item.

In-Person Submissions:

- Submit the Request for Examination forms to the laboratory.
- Personal delivery of evidence is the preferred method for any perishable evidence, evidence of significant monetary value, firearms, and large quantities of controlled substances.
- **Weapons should be unloaded PRIOR to submission; however, if the weapon is loaded due to a technical reason, advise lab personnel immediately upon your arrival. For further information, see Firearms guidelines.**

Mail-In Submissions:

- **Only enclose evidence from one case per package.** Generally speaking, a case is defined as an "incident." **Do not package or mail multiple cases (or incidents) together.**
 - E.g. Buys on separate dates should be packaged separately even if they are on the same subject; however, a search warrant for a house and vehicle that was conducted simultaneously may be submitted as one case.
- Place all sealed, packaged items into a strong, suitably-sized cardboard box. An envelope may be used if there is no danger of damage due to rough postal handling, and the contents will not escape through the openings in the corners of the envelope.
- Pad the evidence to prevent shifting or damage during the mail handling. Seal the container adequately with strong tape, and **initial the seals**. Wrap brown boxes with paper whenever possible.
- Place the Request for Examination form into an envelope addressed to the correct TBI Laboratory, and make sure your return address is clearly indicated. Tape this envelope to the **outside** of the evidence packaging.
- Mark the outside of the package: "Attn: Evidence Receiving."
- All TBI Crime Laboratories will accept evidence that is properly packaged and received from a commercial carrier that provides transfer documentation such as the US Postal Service Registered and Express Mail, UPS, Federal Express, etc.
- Any drug evidence greater than five (5) pounds **must** be hand-delivered to the respective crime laboratory.
- If submitting live ammunition by mail, check with the commercial carrier to ensure proper labeling of the package.
- Any package containing biological materials or materials exposed to biological contamination **must** be properly identified as "BIOLOGICAL HAZARDS."

Evidence Submission Checklist:

Request for Examination Form:

- Is the Request for Examination Form completely filled out?
- Agency name and agency case number
- Name, phone number, email address of Requesting officer (top left on the form). The requesting officer will be the one who has access to the Lab Report in i-Results. Many times this is not the person who actually submits the evidence.
- Type of offense and date of offense
- Name of subject and/or victim, if applicable
- A statement of facts about the case:
Tell the story and be specific, not "victim found obviously dead" or "house was burglarized"
- Description of evidence and where the items were recovered:
Be specific, not just "scene", the address of the scene, victim, subject, or "on person"
- Type of examination requested for each item of evidence
- Laboratory case number if items are additional evidence for a case already submitted to the crime laboratory
- Is the form signed?
- Is the form legible?

Evidence Packaging:

- Is bio-hazardous evidence properly packaged and labeled?
- Is each item of evidence marked and packaged separately and sealed?
- Is each item of evidence labeled with the agency case number and/or subject/ victim's name?
- Is the overall package properly sealed and marked?
- Is there ample space for the Forensic Technicians and Forensic Scientists to label the packaging with TBI case #, barcode, etc?
- Is the packaging large enough that the evidence can be removed for analyses and then placed back in the original packaging?

Mail:

- Is each case packaged individually and sealed?
- Is the Request for Examination Form in an envelope attached to the outside of the main package so that the sealed evidence package will not have to be opened to remove the forms?
- Is the return address legible?
- Has the appropriate postage been affixed?

Forensic Chemistry Evidence:

- All plant material must be dried prior to submission, failure to do so on agencies part may result in analyses not being performed and molding/deterioration of evidence.
- Have all paraphernalia been removed?
- Are all liquids/contents secured so that no spilling occurs?
- Are buys on separate days packaged as separate cases?
- - The Forensic Chemistry Unit will not accept hypodermic syringes/needles or their contents unless it is essential to the prosecution of a homicide, rape, or death investigation. A written request for analysis from the District Attorney must accompany the evidence.

Forensic Biology evidence:

- All evidence must be completely dried prior to submission. Failure to do so may result in analysis not being performed due to molding/deterioration of evidence.
- Evidence should never be packaged in plastic unless it has been completely dried prior to packaging. Brown or white paper bags are the very best option for Forensic Biology evidence submission.
- The term 'buccal swab' derives from the Latin, 'bucca', meaning cheek. A buccal swab, therefore, refers to a DNA collection process involving cells taken from the inside cheek
- "Oral swabs" are usually collected as part of a sexual assault evidence collection kit for the purposes of locating semen.
- Package evidence in such a way that it is covered and will not become exposed during submission to the lab. Keep in mind that multiple layers are not always needed to accomplish this task.

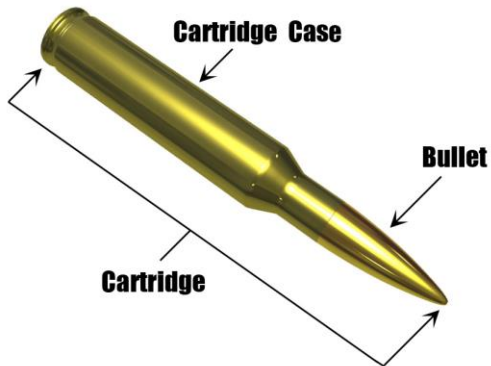
Blood Alcohol/ Toxicology Evidence:

- Don't forget to mark the driver/passenger, living/deceased Boxes.
Failure to do so may result in not all analyses being performed.
- Ensure the collection date, time, and nurses information are filled out.
- If no death, leave nature of death blank.
- Ensure nurse has labeled tubes with agency case # (and subject's name if multiple individuals with same case#).
- Don't forget to seal boxes with blue strips.

- Sealing with evidence tape is not necessary.
- For complete toxicology drug screen submit two full tubes of blood.

Firearms & Toolmark Identification Evidence:

- Please place guns in gun boxes.
 - They tend to fall through bags.
- Please keep cartridges ("live rounds") and magazines in the gun box.
- Please keep cartridge cases ("spent rounds") and bullets
 - Cartridge cases and bullets can go together in the same package (they don't need to be separately packaged inside).
 - You can use a sharpie to write the marker # on the side of the cartridge case, so you can keep them labeled separately.
- Please have ME's office & MED lightly wash or rinse fluids off of bullets found in body, so that rifling is not lost (use a soft toothbrush, if necessary).
- Please write cartridge caliber if known.
- Please do not use evidence spray paint around cartridge cases.
 - It may obscure their markings.
- For your reference:



Change in Case Status/Information

If the status of a case or the progress of an investigation changes and there is no longer a need for the evidence to be analyzed, please advise the laboratory of the change by contacting the laboratory working your case. Knowing that the analysis is no longer needed will free valuable analysis time for other cases.

Request to correct erroneous information or to add additional information after submitting the original Request for Examination form must be made in writing by the officer or agent who made the initial request. Such request can be made by contacting the laboratory working your case. The request must refer to the erroneous information which appeared on the submittal form, and specify the appropriate change(s).

Protection of Evidence from Degradation or Contamination

It is the responsibility of the laboratory to ensure, insofar as reasonable and possible, that evidence does not undergo degradation or contamination while in our possession.

However, proper collection and packaging of evidence are the responsibilities of the submitting officer. One of the purposes of this field guide is to make investigators aware of how to handle certain evidence to prevent deterioration or contamination prior to its arrival at the laboratory.

If the evidence is packaged improperly packaged or placed into a container in which the evidence will deteriorate, the submitting officer will be asked to repackage the evidence prior to submission.

Forensic Biology Evidence

- Items found at different locations must be placed in separate paper containers.
- Latex gloves shall be worn at all times and changed between the collection of **each** item.
- Wet, bloodstained items must not be stored where they may come into contact with any other evidence.
- Wet garments (from blood or other sources) must be air-dried in a protected environment **without** the use of heaters or fans.
- Known reference standards (blood samples or buccal swabs) should be collected from all relevant individuals involved in the case.
- Liquid blood samples should be kept under refrigeration prior to submission to the lab and submitted as soon as possible.
- **DNA analysis may not proceed without standards from all relevant individuals (subjects, victims, consensual partners), or without a request from the District Attorney General.**
- To maintain the integrity of the sample for possible future testing, evidence that has been returned to the agency should be stored in a temperature controlled environment.
- Cases where a toxicology screen is necessary should have the blood sample drawn and submitted separately from the Sexual Assault Evidence Collection Kit. Toxicology samples should be collected using the TBI Blood Alcohol/Toxicology Evidence Collection Kit.
- Forensic Biology cases which do not involve other lab disciplines, such as Firearms, Latent Prints, or Trace Evidence, must be submitted to the regional crime lab closest to the agency's geographical area (Knoxville, Memphis, Nashville).
- **Agencies are required to provide their own buccal swabs for the collection of reference standards. Use of arrestee or convicted offender kits may result in evidence not being analyzed.**

Forensic Biology Unit

Capabilities and Services

Forensic Scientists assigned to the Forensic Biology Unit assist in the investigation of such crimes, as: homicide, sexual assault, property crime, and crimes against persons. Services provided from this unit include: identification of bodily fluids (blood, semen or saliva) and performing DNA testing to determine a potential donor of a particular body fluid. Crime scene assistance is, also, provided by this unit and may be requested by any law enforcement agency in Tennessee. If such assistance is needed, the request should be channeled through the Assistant Director of Forensic Services or their designee.

No Suspect DNA Casework

No Suspect cases are cases where law enforcement has not developed a suspect, or cases in which a suspect has been eliminated through testing or other investigative means.

Cases with no suspects may have DNA testing after a request from the District Attorney General, if a victim's reference standard is available. The results can then be entered into the Combined DNA Index System (CODIS). Exceptions may be made on a case-by-case basis.

Post-Conviction DNA Testing

Post-Conviction DNA Testing will only be performed upon receipt of a Court Order or an Agreed Order. As per TBI Forensic Biology Unit Policy, the standards for comparison listed below may be required prior to DNA testing. *It is preferred that both victim and subject standards be submitted prior to DNA Analysis.* Without these reference standards DNA comparisons may not be made between particular individuals and/or statistical assessment may not be possible.

1. Subject(s)
2. Victim(s)
3. Persons for elimination

Touch DNA Evidence

This type of DNA evidence is defined as evidence with no visible staining and *would likely* contain DNA resulting from the transfer of epithelial cells from the skin to an object. Touch evidence does not include items where saliva might occur or articles of clothing submitted to determine the wearer. Touch DNA evidence will be accepted for possible STR DNA analysis when there is a high degree of likelihood that the evidence will provide interpretable results or investigative leads. A high degree of likelihood may be established by means of witness corroboration, visual monitoring system, or sound deductive reasoning. Due to the nature and limitations of touch DNA evidence and the possible

contamination from DNA obtained from other sources, the following will be considered before items are tested for epithelial touch DNA analysis:

- Items submitted must have been used in the commission of a crime.
- No other probative evidence is available.
- Known suspects and victims must be submitted for comparison.
 - Elimination standards including law enforcement personnel, when appropriate.
- Items submitted must have the likelihood of being handled by one person.
- Items submitted must have the likelihood of epithelial cell transfer – such as rough or uneven surfaces.
 - Casually touched items will be excluded.
- Items have not been previously handled or examined by a TBI, Police, or Private crime laboratory.
- Items have not been processed for latent prints.
- The entire item (not swabbings), when possible, should be submitted for touch DNA analysis.
 - Items, such as guns, should not be swabbed, but submitted in their entirety.
- Swabbings of items, such as the exterior of cars, dwellings, businesses, etc. will not be worked unless there is a high degree of likelihood of association of the subject and the evidence corroborated by witness or visual monitoring system.
- Swabbings from public access areas will not be worked – such as public telephones, doors, office objects, and counters – unless there is a high degree of likelihood of association of the subject and the evidence corroborated by witness or visual monitoring system.
- Cartridge cases will only be analyzed in homicide cases where there is no other probative evidence.
- DNA profiles obtained and eligible to be entered into CODIS must have elimination standards, including law enforcement personnel, when appropriate.
- Touch DNA analysis will not be performed to establish felony possession of a firearm.
- Items submitted for touch DNA analysis will comply with existing policy on the number of items submitted by case type.

DNA Analyses per Case Type

The type of case will determine the number of probative items analyzed for DNA analysis. The most probative items in the case will be examined first. When DNA results are obtained which answer the investigative questions pertinent to the case, then no additional items will be tested without documented management approval. DNA analysis will be complete when an association is established between the subject and victim, subject and crime scene, etc. If the most probative items yield negative results, then additional items may be tested.

Homicides:	Up to 10 probative items + appropriate DNA standards
Sexual Assaults:	Sexual Assault evidence kit (victim) Up to 2 additional probative items (if no kit, then up to 5 items) + appropriate DNA standards
Crimes Against Persons:	Up to 5 probative items + appropriate DNA standards
Property Crimes:	Up to 2 probative items + appropriate DNA standards

TBI Management will have the ultimate authority to approve casework for DNA analysis on a case-by-case basis.

Evidence Submission Guidelines

Please submit evidence that is relevant to the case. Remember the purpose of testing is to establish a transfer of body fluids between the victim and suspect or between an individual who may be bleeding and the crime scene.

- An example of irrelevant evidence might include looking for victim's blood on his/her own clothing or the suspect's semen on his own clothing or bedding.

Handling of Evidence

Latex gloves should be worn at all times and changed between the collection of each item. If any item has been previously tested for blood (e.g., tetramethylbenzadine, phenolphthalein, luminol or BlueStar®), please inform the lab when submitting evidence.

Clothing

Allow clothing to air-dry before packaging in a paper container. Lay the clothes flat; do not fold them. Submit the entire article of clothing. If the clothes must be cut off, never cut through existing holes such as knife or gunshot.

Wet Blood Stains

If the entire item, such as clothing or bedding, can be collected, do so. Remember to air-dry any bloodstains on an item thoroughly before packaging it in a paper container. Never apply heat to dry any item.

If a wet stain is present and the whole item cannot be seized, the stain can be removed using a clean, sterile cotton swab.

Dry Stains

The best choice is to collect the entire article; however, there are times when this is not practical. If a stain must be cut out of an article, such as a carpet, cut the **ENTIRE**

stain. If multiple areas are being cut out of an article, clean the cutting instrument (preferably with alcohol) before going on to the next area to avoid cross contamination.

If an article cannot be removed entirely or cannot be cut, the sample may be absorbed onto sterile swabs. Place a drop of sterile or distilled water on the swab.

Swab the stain until it is no longer visible or until the swab becomes saturated with the stain. If possible, collect at least two swabs. If the sample is very small, be careful not to dilute the sample. Collect the stain on the very tip of the swab until the swab tip is dark in color. Remember it is better to have a small, dark stain than a large, light stain which may be less suitable for laboratory examination.

Reference Standards

Known standards (blood or buccal swabs) should be collected from all relevant persons involved in the case. If an individual did not bleed, but his/her clothes are being sent for comparison purposes, his/her standard should, also, be sent for elimination purposes.

Liquid blood samples should be kept under refrigeration prior to submission to the lab and should be submitted as soon as possible. Never freeze liquid samples.

A blood sample can be collected in any size purple top (EDTA) tube. Buccal swabs should be collected using sterile cotton swabs submitted in a paper envelope. **Do not use Arrestee or Convicted Offender DNA Kits.**

Alternate Standards

If no blood sample is available due to complete exsanguination (loss of blood) or if an individual has been transfused, alternate standards may be obtained, which can include:

1. An article of clothing that is stained with what is expected to be the individual's own blood.
2. If the individual has been transfused and is still alive, collect buccal swabs.
3. If the corpse has bled out or is decomposing or is missing, collect an item that the individual is known to have had intimate contact with while alive, such as their toothbrush or hairbrush.

Sexual Assault Cases

1. Take the victim to the hospital, as soon as possible, to have a Sexual Assault Evidence Kit collected. Do not let the victim clean up prior to going to the hospital. Evidence could be lost by allowing the victim to clean up.
2. If a suspect is apprehended, either consent or a search warrant will allow for the collection of a reference standard sample. Do not package subject's standard inside the victim's kit.
3. Additional articles which may bear body fluids may be collected by the responding officer or crime scene unit.

4. Blood soaked items should be air-dried without heating before being submitted in sealed paper bags. If your agency does not have a facility for drying items, please contact the Forensic Biology Unit at the appropriate laboratory for instructions.
5. Cases where a Toxicology screen is necessary should be submitted separately from the Sexual Assault Evidence Collection Kit. Toxicology samples should be collected using the TBI Blood Alcohol/Toxicology Evidence Collection Kit. Also, never submit urine samples as part of a sexual assault kit as this type of testing is not performed by the Forensic Biology unit.

Condoms

Packaging a condom presents a unique challenge, since it is usually wet and can't be packaged in a plastic bag or directly in a paper bag. The best solution is to first obtain a sterile lab specimen cup or urine cup. Create a few small holes or punctures in the lid for ventilation and place the condom in the cup. After placing the lid on the cup, package the cup in a paper bag and properly seal (evidence tape and initials) for submission.

Fingernail Evidence

The Forensic Biology Unit often receives requests to look for tissue from under the fingernails of victims who have scratched their attacker. Depending on the length of the fingernails, a combined swabbing of the nails on a particular hand is preferred for long nails and combined scrapings are preferred for short nails. Place these in a sealed container and label appropriately.

If the victim is deceased, one should "bag" the hands and let the medical examiner collect the samples.

Cigarette Butts

While wearing latex gloves, one should pick the butts out of the ashes and place them in an envelope. If the victim or suspect is a smoker, try to determine his/her brand preference and indicate it on the envelope or Request for Examination form.

Packaging Considerations:

1. Place each item collected into its own sealed container. Do not package several items together. An exception to this rule may be made if the item is blood-soaked and still wet. These wet items can be placed in Plastic Biohazard Bags for transport to a facility where they must be air-dried before placing in paper containers for submission.
2. Always package in paper. Never use plastic bags, as they promote bacterial or fungal growth.
3. Pad fragile and sharp articles so that they will not break or penetrate the packaging. Corrugated cardboard is good to use with these items.
4. Air-dry all evidence.
5. Store evidence in a cool and dry location.

6. Always seal the packaging and initial the seal prior to submission. Items not sealed properly will not be accepted by the Evidence Receiving Unit.

Submission Considerations:

1. Submit biological evidence as quickly as possible after it is determined what questions in a case may be answered by DNA analysis. Do not submit blood just because it is found and collected; determine if analysis is needed, then submit the sample(s) as quickly as possible.
2. Submit autopsy samples, as soon as possible, since they begin to degrade immediately upon death.
3. Never submit a loaded weapon to the laboratory.
4. The depth and scope of examinations selected by the Forensic Scientist for a given case depends to a large extent on the amount of information provided by the submitting officer. Therefore, it is imperative to include a complete description of the facts of the crime on the Request for Examination Form or to attach a copy of the investigative report. Forensic Scientists in the Forensic Biology Unit need to know, for example:
 - How many people could have bled?
 - What the officer believes happened and what he/she seeks to prove by the analyses?
 - What, if any, unusual circumstances may have affected the blood stains such as soaking, heating, or contamination?
5. Complete information is, also, essential in making analysis determinations in sexual assault cases as to the potential donor of any semen detected. Since one is often dealing with a mixture of bodily fluids from at least two individuals in these cases, the Forensic Scientist **MUST** know if the victim had consensual sexual intercourse with any other individuals in the 72 hours prior to the assault. Other important information to gather may include:
 - Did the subject ejaculate?
 - Was the subject wearing a condom?
 - What body cavities were penetrated?
 - Did ejaculation take place outside the body, and if so, where was the semen deposited?
 - Was the victim a child or mentally-challenged or otherwise incapacitated during the assault?

Safety Considerations:

A number of potentially deadly biohazards are associated with body fluid evidence. Bear in mind, these safeguards apply to all persons handling evidence possibly containing body fluids.

1. Always assume that unknown samples may be infectious and handle the evidence accordingly, using gloves.
2. Do not smoke, drink or eat until after removing gloves and washing hands.
3. Do not agitate the stain and avoid flaking off fine particles that may become airborne.

4. Whenever possible, check with the victim(s) and suspect(s) to determine if they have a communicable disease, such as, but not limited to: AIDS, hepatitis, TB, and/or venereal disease. Note this on the Request for Examination Form.

Firearm and Toolmark Identification Unit

- Always assume the weapon is loaded and ready to fire.
-
- Always point the weapon in a safe direction.
- Collect all relevant live ammunition at a crime scene for use as standards.
- Do not mark cartridge cases or bullets in any manner.
- Whenever possible, collect the item(s) containing the toolmark(s).
- Package all toolmark evidence separately. Package the working end of a suspect tool to prevent damage to the working surface and to prevent loss of possible trace evidence.
- When submitting evidence for entry into the Integrated Ballistics Identification System (IBIS) only, no other laboratory analysis will be performed. If other analyses are requested, indicate that on the Request for Examination form.

- Types of evidence suitable for entry into IBIS include:
 1. Shootings that have the potential of being a serial type (such as, homicides, gang-type, drug-related, drive-by shootings and robberies).
 2. Confiscated firearms (from drug or gang suspects, vehicle stops, recovered stolen firearms).
 3. Non-police firearms from officer involved shootings.

Capabilities and Services:

- Determine whether a bullet, cartridge case, or shotshell was discharged from or in a particular firearm.
- Determine if a particular toolmark or tool impression was made by a specific tool.
- Determine if a broken part or piece of a tool or firearm was once part of a particular tool or firearm.
- Determine if a gunshot residue pattern or shot pattern is present on a given article (e.g., clothing, bed sheets, and curtains) and, if present, determine how far a specific firearm muzzle was from the article at the time of firing.
- Identify bullets and/or cartridge cases, as to type, caliber, and possible manufacturer. Provide listings of type, make, or caliber of firearms that may have fired a particular bullet.
- Determine shot size, wadding, gauge, and possible manufacturer.
- Perform serial number restorations on firearms and other items, where possible.
- Determine trigger pull weight and if a firearm functions properly.
- Provide assistance at crime scenes pertaining to forensic firearms and/or toolmarks.
- Make submissions of fired bullets and cartridge cases to the Integrated Ballistics Identification System (IBIS).

- Maintain an open case file of cartridge cases involved in unsolved cases and do automated checks against firearms, as well as, other bullets and cartridge cases against these unsolved cases using IBIS.
- Maintain a firearms reference collection.
- Maintain an ammunition reference collection.

Types of Analyses or Examinations:

Firearm or Ammunition Cases

Bullets, cartridge cases, and shotshell cases are compared to a suspected firearm in the following manner: forensic scientists fire test cartridges of the same manufacturer, caliber or gauge, and bullet type or shot size from the suspect firearm. The test bullet, cartridge case, or shotshell case is next compared microscopically with the submitted evidence bullet, cartridge case, or shotshell case.

Toolmark Cases

In toolmark examinations, forensic scientists microscopically compare test toolmarks made with a suspect tool to submitted toolmarks. Generally, toolmarks fall into two categories: impressions or striated.

Please note that it takes a considerable length of time to reproduce questioned toolmarks with a particular tool. Therefore, do not submit a toolmark for comparison with a tool left at the scene of a crime unless the suspect tool can be connected to a suspected perpetrator through investigation.

Gunshot Residue Pattern Analysis (Victim Only)

Gunshot residue pattern analysis helps reconstruct aspects of a shooting, especially distance determination. Articles submitted for analysis are chemically treated with solutions capable of indicating the presence of nitrites from gunpowder or lead particles and vapor. If a gunshot residue pattern is located, the suspect firearm is test-fired at various distances using the type of ammunition used in the crime. These test-firings produce standard test cloths. The gunshot residue pattern on test cloths that most resembles the pattern on the evidence provides an approximate distance of the firearm muzzle at the time of firing.

Firearm Serial Number Restoration

Obliterated serial numbers prevent investigators from tracing firearms. The serial number may have been filed, ground punched, or even treated with acid. An examiner can frequently obtain an obliterated serial number through a process known as chemical etching. Once the serial number is restored, a weapon can be traced and determination of whether it has been stolen can be made.

Note: Please submit other types of serial number restorations to the Firearms Unit, also.

Integrated Ballistics Identification System

Integrated Ballistic Identification System (IBIS) is an automated computer system that captures the individual signatures of fired cartridge cases and stores them in a database. The system is designed to run correlations on these signatures to determine any possible matches.

Evidence Submission

Proper collection, marking and handling of firearm and toolmark evidence makes the Forensic Scientist's work easier and ensures a more complete examination. Please observe the following general guidelines for proper collection, working and handling of firearm and toolmark evidence:

Firearms

- Never place anything into the barrel of a suspect firearm.
- If the submitting officer deems it necessary to have the firearm processed for latent prints, handle the firearm only by those areas that normally do not yield fingerprints (e.g. checkered grips, edges of the trigger guard, or any knurled area).
- Carefully unload the weapon at the scene.
Note: On rare occasions, the weapon may be rusted or jammed – making it impossible to unload at the scene. In these instances, notify the Firearms Unit of the laboratory serving your area.
- On revolvers, note which chamber was under the hammer and/or the location of discharged and live cartridges in relation to that chamber.
- On pistols and other weapons that load by magazine, remove the magazine and live cartridge from the chamber.
- Use care if marking firearms. Usually the side plate of revolvers and the slide area of automatics are the best locations for identifying marks. Be careful not to destroy any trace evidence when marking a firearm. If the firearm is to be examined for latent prints, do NOT mark the weapon, place all necessary information on a tag and attach a tag to the weapon. If possible, record the serial number, make, and model of the submitted weapon in your notes.
- Collect firearms separately – preferably in a cardboard box. Do not use plastic bags for firearms that are being submitted to the Latent Evidence Unit, Microanalysis Evidence Unit, or Serology/DNA Unit.
- Firearms discovered in water should be submitted in the same water in a watertight container.

Bullets, Cartridge Cases, and Shotshells

- Collect all relevant live ammunition at a crime scene for use as standards.
- Do not mark cartridge cases or bullets by etching or scratching. Place them in individual envelopes and place all necessary identification data on the outside of these envelopes. This process prevents accidental marring of the

- important surfaces of the bullet and/or cartridge case and accidental destruction of trace evidence. All containers should be sealed and initialed.
- When collecting bullet, cartridge case, shotshell, and similar evidence at a crime scene, do not attempt to wash or clean the evidence.
 - Do not place cotton or tissue around bullets, as this material may adhere to blood or other matter on the surface of the bullet.
 - **At autopsies, we request that pathologists attempt to clean blood or other bodily fluids off the evidence prior to packaging.**

Examination of Gunshot Residue Evidence

- Air-dry clothing or other articles submitted for gunshot residue pattern examinations.
- Place each piece of evidence in separate, sealed paper bags. Never use plastic bags to store gunshot residue evidence.
- Always wear protective latex gloves when handling bloody items. Handle items carefully, as shaking or brushing may remove evidence.

Toolmark Evidence

- Whenever possible, collect the item(s) containing the toolmark(s).
- In the case of extremely large or immovable items, either remove that section of the item containing the toolmark or make a cast of the toolmark using Mikrosilor or other suitable casting material.
- Package all toolmark evidence separately. Package the working end of a suspect tool to prevent damage to the working surface and to prevent the loss of possible trace evidence. Do not use tape to cover or protect the end.
- Never touch or fit a suspected tool to a toolmark.
- Never clean a tool or a cast of a toolmark yourself. Submit the evidence, as is, to the laboratory.
- Never make your own test marks with a suspect tool.
- Mark all containers for identification and make sure they are properly sealed.

Test Cartridge Cases/Evidence Cartridge Cases for Entry into IBIS ONLY

- Use one Request for Examination Form for each case to be submitted.
- When submitting evidence for entry into IBIS only, no other laboratory analysis will be performed.
- If there is a need for other laboratory analysis to be performed on the submitted evidence, mark that on the Request for Examination form.
- If submission of the weapon is not possible, submission of the test-fired cartridge cases is permissible, assuming the proper procedures are followed. It is mandatory that the Agency Case number, incident/recovery date, and make, model and serial number of the firearm be provided by the submitting officer on the Request for Examination form.

- Only the calibers listed under the following heading will be accepted for entry into IBIS. Also provided is a list of recommended ammunition that should be used when test firing.
- Types of cases suitable for entry into IBIS include:
 1. Shootings that have the potential of being a serial type (such as: homicides, gang-type, drug-related, drive-by shootings, and robberies).
 2. Confiscated firearms from drug or gang suspects, vehicle stops, recovered stolen firearms, etc.
 3. Non-police firearms from officer involved shootings.
- IBIS is state-of-the-art technology. This technology is changing at a rate much faster than procedure manuals can be written. If you have any questions about the system, contact the TBI Firearm and Toolmark Unit at the laboratory serving your area.

IBIS Standard Ammunition Protocol

A.1 – Standard Ammunition Protocol Table for Revolvers/Pistols

CALIBER CLASS	BRAND OF AMMUNITION TO USE
.22 Caliber	Remington .22 Standard Velocity Lead Round Nose CCI .22 Mini Mag Copper Coated Round Nose
.25 Auto	Remington, PMC, UMC 50 grain metal case, FMJ
.32 Auto	Remington, UMC or PMC , FMJ
.32 S&W	Remington Lead Round Nose, 88 grain lead Winchester Copper Coated Lead Round Nose
.32 S&W Long	Remington , 98 grain Lead Round Nose Winchester Copper Coated Lead Round Nose
.380 Auto	Remington or PMC 95 grain FMJ UMC 95 grain Metal case
9mm Luger	Remington or PMC 115 grain FMJ UMC 115 grain metal case
9mm Makarov	CCI 95 grain FMJ or Federal 90 grain JHP
.38 Special	Remington or UMC 158 grain Lead Round Nose CCI .38 Spl. +P JHP Remington FMH or Hornady .38 Spl. 158 grain JHP
.357 Magnum	Same as .38 Special
.357 Sig	Remington 125 grain JHP UMC 125 grain Metal Case Federal 180 grain FMJ
.40 S&W	Remington 180 grain JHP Federal 180 grain JHP UMC 180 grain Metal Case
10mm	Remington 180 grain JHP or UMC 180 grain metal case Remington or PMC 200 grain metal case
.41 Magnum	Remington 210 lead or JSP PMC 210 grain lead or JHP
.44 Magnum	Remington 240 grain Lead semi-wadcutter or JSP CCI Blazer or PMC .44 Special 180 grain JHP Remington or CCI Blazer .44 Special 246 grain lead
.45 Auto	Remington or PMC 230 grain metal case UMC 203 grain metal case

Abbreviations:

- UMC** – Union Metallic Cartridge
- PMC** – Precision Metal Corporation
- CCI** – Cascade Cartridge Industries
- FMJ** – Full Metal Jacket
- JHP** – Jacketed Hollow Point

Report Interpretation

Firearm Examinations

- **Class characteristics:** measurable features of a specimen, which indicate a restricted group source. The class characteristics of firearms may include the caliber, the number of lands and grooves, the widths of the lands and grooves, direction of rifling twist, size and type of firing pin, and position and type of extractor and/or ejector.
- **Individual characteristics:** imperfections or irregularities produced accidentally during manufacture or caused by use, abuse, corrosion, rust, or damage. Individual characteristics are unique to an object and distinguish it from all other objects.

Bullets, Cartridge Cases, and Shotshell Cases Compared to a Suspect Firearm

- **Positive Result:** The bullet, cartridge case, and/or shotshell case was fired from and/or chambered in the suspect firearm. The bullet, cartridge case, and/or shotshell case has the same class characteristics as the suspect firearm and sufficient matching individual characteristics to make an identification.
- **Inconclusive Result:** The bullet, cartridge case, and/or shotshell case has the same class characteristics as the suspect firearm, but lacks sufficient similar individual characteristics or has no discernible individual characteristics permitting a positive identification or elimination.
- **Negative Result:** The bullet, cartridge case, and/or shotshell case was not fired in or from the suspect weapon. The bullet, cartridge case, and/or shotshell case has different class characteristics than the suspect firearm or the individual characteristics are so different as to preclude an "inconclusive result."

Toolmarks Compared to a Suspect Tool

- **Positive Result:** The suspect tool made the toolmark. The toolmark has the same class characteristics as the suspect tool (e.g., shape, size, manufacturing marks, etc.) and sufficient number of matching individual characteristics to make identification.
- **Inconclusive Result:** The toolmark displays the same class characteristics or some of the class characteristics of the suspect tool, but lacks sufficient similar individual characteristics or has no discernible individual characteristics permitting a positive identification or elimination.
- **Negative Result:** The suspected tool did not make the toolmark. The toolmark either has different class characteristics than the suspect tool or the individual characteristics of the toolmark are so different as to preclude an "inconclusive result."

Firearms Reference Collection

The Firearm and Toolmark Unit maintains a reference collection of firearms confiscated by state and local law enforcement agencies.

This important reference collection:

1. Serves as a parts source to enable test firing of broken or incomplete weapons submitted as evidence in criminal cases;
2. Provides an information source for comparisons against factory markings and serial number stamping practices when these markings have been obliterated or altered on evidence exhibits; and,
3. Provides weapons for research projects in the field of firearms and ammunition identification and weapons for initial and in-service training of firearm and toolmark examiners.

Firearms may be submitted to the Firearm and Toolmark Unit Firearms Reference Collection by any law enforcement agency. It is imperative; however, that submitted firearms are accompanied by a court order authorizing the TBI Firearm and Toolmark Unit to either:

1. Maintain the firearm(s) in the reference collection, and/or
2. To destroy firearms serving no useful purpose.

Forensic Chemistry Unit

- The Forensic Chemistry Unit accepts evidence if a criminal arrest has been made or is anticipated, or as part of a death investigation.
- The Tennessee Bureau of Investigation will accept drug evidence that is properly packaged and received from a commercial carrier that provides transfer documentation, such as: the US Postal Service Register and Express Mail, UPS, Federal Express, etc. Any drug evidence greater than five (5) pounds must be hand-delivered to the respective crime laboratory.
- Law enforcement officers are encouraged to allow ample room in each outer evidence bag so as to allow the forensic scientist room to repackage any evidence after sampling/testing has taken place.
- Fill out the Request for Examination form completely and neatly (legibly) prior to submission.
- Evidence seized from body cavities or evidence that might be contaminated with body fluids or biological waste should be clearly marked as biohazardous and notations concerning this evidence should be made of the Request for Examination form.
- Submit the best evidence in each case and omit drug paraphernalia, powder residues, and cigarette butts, as these items are not routinely worked by Forensic Chemists.
- Be sure that all items are properly separated and sealed to prevent cross contamination.
- Be sure that all items are secured so that they do not coat the packaging – avoiding loose plant material, and powders.
- Avoid sending plants (including marijuana, mushrooms, and cacti) to the laboratory unless they have been dried.
- The Forensic Chemistry Unit will not accept hypodermic syringes/needles or their contents unless it is essential to the prosecution of a homicide, rape, or death investigation. A written request for analysis from the District Attorney must accompany the evidence.

Forensic Chemistry Unit

Capabilities and Services:

Analyses to determine the presence of controlled substances.

Evidence Submission Guidelines:

- The Forensic Chemistry Unit accepts evidence if a criminal arrest has been made or is anticipated, or as part of a death investigation. Evidence from concerned parents, schools, organizations, private citizens, found property, and evidence that has no value for criminal prosecution will not be accepted.
- The Tennessee Bureau of Investigation will accept drug evidence that is properly packaged and received from a commercial carrier that provides transfer documentation such as the US Postal Service Registered and Express Mail, UPS, Federal Express, etc. Any drug evidence greater than five (5) pounds must be hand delivered to the respective crime laboratory.
- When submitting sizeable quantities of any drug, you must contact the laboratory in your service area to schedule an appointment for personal delivery.
- Fill out the Request for Examination form completely and neatly prior to submission.
- Drug evidence seized from different people should be submitted on separate Request for Examination forms, even if the people were arrested at the same time or at the same incident. This procedure will result in separate laboratory reports being issued for each person, which will avoid problems and confusion in subsequent judicial proceedings.
- Drug evidence seized from the same person on different dates should be submitted on separate Request for Examination forms.
- Evidence seized from body cavities or evidence contaminated with bodily fluids or biological waste should be clearly marked as a biohazard and notations concerning this evidence should be made on the Request for Examination form.
- Submit the best evidence in each case, omitting drug paraphernalia, powder residues and cigarette butts.
- Be sure that all items are properly separated to prevent cross-contamination. Place each item into separate containers and seal all items into one tape sealed container for submission to the laboratory, if possible. Be sure that all seals are dated and initialed and that the evidence is marked with the subject's name and the agency case number.
- The Forensic Chemistry Unit will not accept hypodermic syringes/needles or their contents unless it is essential to the prosecution of a homicide, rape, or death investigation. A written request for analysis from the District Attorney must accompany the evidence.
- In cases where Federal Prosecution is to take place, a letter from the US Attorney General will be required before analysis begins on all items submitted (i.e. methamphetamine requiring a purity for quantitative analysis). These cases will be held until a letter from the Assistant United

States Attorney is received requesting quantitative analysis. At this time the sample will be turned over to the DEA lab for testing.

Limitations to Evidence Submission

- The Forensic Chemistry Unit routinely will not identify more than three items from Tennessee Code Annotated per case. In addition, all drugs will be routinely worked to a weight threshold. When two or more subjects are charged collectively with the same items, the group will be treated as a single individual for the purposes of analysis.
- Only sufficient items to constitute a felony will be analyzed in large pharmaceutical controlled substances cases, such as drugstore burglary cases.
- Because the laboratory has a limited storage capacity, bulk quantities of controlled substances may be sampled or analyzed by Forensic Scientist and returned to the submitting officer the same day, if possible. To ensure that a Forensic Scientist is available, contact the Forensic Chemistry Unit Supervisor at 615-744-4450 before transporting this type of evidence to the laboratory.
- Evidence in product liability cases, drug residues on currency, and cases involving stomach contents (lavage) will not be analyzed.

Report Interpretation

- The Forensic Chemistry Unit reports results as to the controlled substances or other illegal drugs (e.g. synthetic drugs) present, their schedule and amount. If possible, synthetic drugs will be reported and a statement will be issued regarding their legality.
- Forensic Scientists, occasionally, do not report measured weights for small amounts of marijuana and powders. In some cases, the chemist may report a small amount, trace or residual quality.
- Any weight listed on the laboratory report shows only the weight of the material identified and does not include the weight of the bags, containers, and wrappings unless specified in an accompanying remark.
- Particular salt forms of a drug are not usually reported. For example, cocaine hydrochloride would be listed on the laboratory report only as cocaine. The form of cocaine, more commonly known as "crack," will be listed as cocaine base when such identification is possible. Typically, cocaine base will only be reported if 28.00 grams or greater.
- Please contact the Forensic Chemistry Unit Supervisor at 615-744-4450 for assistance if you have any questions on the submission of evidence for controlled substance analysis.

Latent Print Unit

- Always process surfaces suspected to have been handled.
- Develop a routine or pattern in fingerprint processing to ensure each scene is completely examined.
- Supply the following information on all lifts:
 1. The name (or initials) of the individual making the lift;
 2. The date the lift was made;
 3. A case number or other identifying number;
 4. An indication of where lift was obtained (description or diagram); and
 5. Duplicate lift notation.
- DO NOT process or attempt to lift prints in blood. Allow bloody items or prints to air-dry naturally and photograph, with a ruler, if possible. Do not dry with forced hot air (e.g. hair dryer).
- Send all known fingerprints used for latent comparison purposes directly to the Evidence Receiving Unit.
- Submit a suspect's and victim's full name, race, sex, and date of birth if available.

Capabilities and Services

The Latent Print Unit provides assistance in the analysis of any item of evidence which falls into one or more of the following categories:

- Latent Fingerprints
- Latent Palm Prints
- Latent Footprints (bare feet)
- Identification of Unknown Deceased Individuals

The term "latent" refers to hidden or invisible impressions. The term "patent" refers to visible impressions. Please note that throughout the following guidelines, "latent" refers to both visible and invisible impressions.

Latent fingerprints, palm prints, and footprints can be of sufficient value for positive identification purposes. Such evidence can indicate that an individual's finger, palm, or foot *did* make the impression in question.

Processing for Latent Prints at Crime Scenes

Most crime scene processing for latent prints consists of using photography and powders. Latent print processing with powders involves the gentle application of powder to the slightly adhesive skin oils left on the surface of non-porous items (glass, plastic, metal, etc.).

Powdering and lifting latent prints takes practice and it is recommended that training include a variety of shapes and surfaces likely to be encountered at a crime scene. Once a print is destroyed, it cannot be reconstructed.

After a print is developed on a non-porous surface, photograph it if possible, making sure to include a ruler in the picture so that the print may later be restored to accurate size. A disc containing these images may, also, be submitted as evidence. Lift the developed print with fingerprint tape. Whenever possible, make a duplicate lift.

Supply the following information on all lifts:

1. The name (or initials) of the individual making the lift
2. The date the lift was made
3. A case number or other identifying number
4. An indication of where the lift was obtained (description and diagram)
5. Duplicate lift notation

Do not mark directly behind the latent-lift to minimize interference with AFIS entry.

Porous or absorbent surfaces, such as paper, cardboard and unfinished wood ordinarily cannot be processed with powders, as skin oils soak in and are not left exposed to the powders. Evidence of this type should be submitted to the laboratory for chemical processing.

Various light sources are available in the TBI Crime Laboratory. The equipment has limited capabilities in field situations, and is best utilized in a controlled environment.

The Forensic Scientist assigned to each case determines the method of analyzing an item of evidence. Please note if any evidence has been processed prior to its submission to the Crime Laboratory.

For wet items, the best results will be obtained in the laboratory. Allow wet items to air-dry naturally. Do not dry with force hot air (e.g. hair dryer). Do not attempt to powder process a wet item of evidence. Do not package a wet item of evidence. Do not package an open container that still contains liquid. Carefully, pour the liquid out and submit the container for processing. If needed for additional testing, save the liquid in another container and note this on the Request for Examination form.

DO NOT process or attempt to lift prints in blood. Allow bloody items or prints to air-dry naturally and photograph, with a ruler, if possible. Do not dry with forced hot air (e.g. hair dryer).

Please note that there is no scientific method for determining the age of a latent print.

In latent print cases, provide both entire fingerprints and palm print impressions of the subjects involved. Whenever possible, finger and palm prints of the victim should, also, be submitted. This is especially important in cases involving numerous latent prints. When fingerprinting someone, collect complete (fully rolled) and legible prints. Please

note that prints suitable for classification purposes are not always of sufficient quality for latent prints comparisons.

Evidence Submission

Cases will be prioritized when they are received into the latent print unit.

Cases of a violent nature, such as: homicides, rapes, and robberies, will be processed first. Non-violent cases, such as: burglaries, thefts, and vandalisms, will be worked in the order they are received into the laboratory, at a lower priority.

It is recommended that investigators process non-porous evidence at the scene of non-violent crimes using basic latent print supplies (brush, black powder, lift tape, and 3 x 5 index cards) and submit the latent lifts as evidence.

Porous items (paper, cardboard, etc.) and evidence requiring advanced latent print processes (e.g. bloody evidence, tape, etc.) collected at non-violent crime scenes should be submitted to the laboratory for processing.

When requesting both latent print and controlled substances testing in a case, the evidence must be separated prior to submittal to the laboratory. If the controlled substance and packaging are not separated, the submitting officer must choose which analysis will be performed (either drug testing or latent processing).

Some of the factors affecting latent prints and their quality include: the surface material containing the latent print(s), the amount of perspiration, oils, and foreign matter on fingerprint ridges, weather conditions, pressure, duration, and the handling of the item containing the latent fingerprint(s). Latent prints are very fragile and can easily be destroyed; therefore, extreme care should be used when handling any item suspected of containing latent prints. Handle evidence very carefully – even when wearing gloves. All evidence submitted for latent prints should only be handled when wearing gloves.

Send all known fingerprints for latent comparison purposes *directly* to the Evidence Receiving Unit.

Submit the subject's and victim's full name, race, sex, and date of birth. If inked impressions are not submitted with the evidence, the TBI fingerprint file will be searched.

When possible, collect a set of known inked impressions specifically for latent print examination.

Submitted known impressions will be returned to the requesting officer after analysis has been completed.

Prior to packaging evidence related to latent prints, conduct a visual examination for obvious latent prints. If any are observed, package and secure the evidence in a suitable container that will prevent the impression from smudging or damage. Follow the Crime

Laboratory's standard evidence submission procedures. Check all packages for proper seals and sufficient labeling.

Hand-carrying fragile evidence to the laboratory is the best way to prevent damage.

Remember not to package wet items. Air-dry them and then package them in paper bags or cardboard boxes.

Wear surgical (or smooth surface) gloves and handle evidence "lightly." Do not write on containers to be processed for latent prints. Place such items in a separate container, and label that container carefully.

When submitting tape, package each strip or piece in separate containers to prevent the loss or cross-contamination of trace material, and to prevent pieces from adhering to one another.

It is important to distinguish packaging from evidence on the submittal form to eliminate unnecessary processing. This may be accomplished by marking all packaging (including interior packaging) or noting non-evidentiary items on the submittal form.

Automated Fingerprint Identification System

The Latent Print Unit provides local agencies with access to the state's Automated Fingerprint Identification System (AFIS). The AFIS computer stores images of most of the ten print fingerprint cards on file at the Tennessee Bureau of Investigation. The Latent Print Unit, also, has the capability to search a latent print through the national (IAFIS) database under certain circumstances.

The AFIS computer can search a latent fingerprint or palm print from a crime scene against fingerprint cards stored in the AFIS database. If the person who left a fingerprint at a crime scene has fingerprints stored in AFIS, the TBI may be able to identify the latent print and provide the name of the potential suspect. If a latent print is searched against the AFIS database with no identifications, additional searches will be conducted as new known impressions are entered into the database.

Please note that the TBI AFIS system cannot search the joints, sides, or tips of fingers, or footprints.

AFIS Evidence Submission

Submit latent fingerprints for AFIS searches with a completed evidence submission form.

Submit AFIS requests to the TBI Evidence Receiving Unit.

Any questions concerning the submission of AFIS latent print searches should be directed to the TBI Latent Print Unit.

All questions regarding "Ten Print Cards" should be directed to the TBI ISS Unit (615-744-4000).

Report Interpretation

A latent print report lists the evidence processed and the results of the examination.

An identifiable latent print result indicates that identification may be possible if known impressions are available for comparison.

Reports with latent print identifications indicate the subject's name, the finger or palm identified, and when possible the location of the print.

Occasionally, submitted and/or developed latent prints will remain on file for future comparisons. The status of evidence will be included in the disposition of the lab report.

Some evidence cannot be stored at the laboratory; therefore, once the lab report has been received from the laboratory, evidence must be picked up by the submitting agency within thirty (30) days.

Microanalysis Unit

- Do not package the victim's and suspect's clothing together.
- **No attempts should be made to collect or remove shoe impression evidence from a crime scene without first photographing the print or track. This must be performed with a measuring device (such as, a ruler). The camera must be perfectly parallel over the shoe impression and the impression must fill the picture frame as much as possible. Then the impression must be cast, lifted, or removed and submitted for analysis.**
- Fire debris evidence should be packaged in clean metal paint cans or mason-type jars and filled only $\frac{1}{2}$ to $\frac{3}{4}$ full. Never package fire debris in plastic or paper bags.
- Gunshot Residue (GSR) SEM Kits – TBI recommends using the kits provided by the laboratory and following the instructions provided within them. Kits from outside vendors will, also, be accepted and analyzed.
- Wet or bloody items of evidence associated with hit-and-run accidents should not be air-dried. Submit immediately to the laboratory for analysis.
- Submit known paint and glass standards in sealed containers (i.e., druggist fold pieces of paper, envelopes with all edges taped, or film canisters).
- A request for fiber analysis can only be performed when fiber standards (i.e., carpet or upholstery) are, also, submitted with the subject's and/or victim's clothing.

Microanalysis Unit

Capabilities and Services

The Microanalysis Unit deals with a wide variety of evidence. If a laboratory technique is not listed below, please contact the Microanalysis Unit with inquires.

- Fire Debris Examination for petroleum products and alcohols
- Analysis for oils and greases
- Analysis of gunshot primer residue SEM kits
- Analysis for gunshot primer residue on subject clothing and other items
- Shoe impression comparisons
- Tire impression comparisons
- Tire manufacturer and model determination from tire impressions
- Brand and model determination from shoe impressions
- Paint comparisons
- Vehicle make and model determination from paint evidence
- Glass comparisons
- Glass fracture analysis and order breakage
- Fiber comparisons
- Indented writing determinations
- Physical comparisons such as fracture match analysis or comparisons of similar items
- Analysis for heavy metals, such as: arsenic, copper, thallium and lead
- Analysis for chemical sprays
- Unknown substance determination
- Tape comparisons
- Explosive analysis

Fire Debris Examinations

Debris from fire scenes is submitted to the Crime Laboratory to determine the presence of an unconsumed ignitable liquid. This includes the products of refined oil (gasoline, kerosene, diesel fuel, etc.), alcohol and other flammable/combustible products.

Ignitable liquids that have not been consumed by fire, washed away by water, or evaporated by exposure, are most often found remaining in materials that have absorbed them easily and retained them well. These include: carpeting, soft woods, fabrics, paper, soil, and, occasionally, concrete.

Collection and Packaging of Evidence

Wear clean disposable gloves for the collection of each piece of evidence suspected to contain an accelerant. Change gloves between collection of each evidence sample.

Use clean tools for collection, cleaning and rinsing tools between each sample.

Store debris and samples in clean paint cans and mason-type jars. These cans should be filled no more than $\frac{1}{2}$ to $\frac{3}{4}$ full. If a large clothing item is to be analyzed, cut the item into pieces and use several cans.

The can lids should be closed using a hammer. Stomping the lid to the can with your foot may not produce an airtight fit.

Liquid samples should be removed from large containers before submission to the laboratory. Place liquid samples in small glass or metal containers.

Unsuitable Containers

DO NOT USE:

- **Paper bags,**
- **Nylon or aluminized Mylar bags,**
- **Polyethylene bags, or**
- **Coffee cans with plastic lids.**

When alcohols are suspected, this must be indicated on the Request for Examination form, as additional testing is required.

Laboratory Examination of Fire Debris

The primary role of Forensic Scientist is the recovery and determination of any ignitable liquid residue in the samples submitted. A report will be generated identifying the accelerant with examples of possible products.

Terpenes are often identified in debris containing some types of wood. These chemicals are present in turpentine and occur naturally in some wood products; therefore, it is not possible for the Forensic Scientist to determine the origin of the terpenes.

In addition, the chemical **toluene** can be recovered from most shoes with glued soles. A report will indicate the presence of this chemical with an explanation of the possible origin. A heavy petroleum product is sometimes recovered from some types of shoes and inks used for printing. The laboratory results will reflect this identification.

Analysis for Oils and Greases

The analysis for oils and greases can become relevant in the investigation of sexual abuse and hit-and-run cases. Petroleum and vegetable-based oils, greases and lubricants can be analyzed and compared to known samples.

In cases of suspected sexual abuse, the suspected oils and lubricants should be submitted with the victim's clothing. The clothing should be packaged in sealed brown paper bags. The oils and greases can be packaged in plastic bags and sealed metal paint

cans. Care should be taken to assure that the known lubricant does not leak through the packaging and contaminate other evidence.

Clothing from the victim(s) of hit-and-run accidents should be packaged in brown paper bags. Known lubricant samples need to be taken from the undercarriage of the suspect vehicle with particular interest in the areas beneath the vehicle showing possible disruption

Analysis of Gunshot Residue Kits

The analysis is used to determine the presence of antimony, barium and lead, which are the main elements of gunshot powder residue, from the hands of individuals who may have fired, handled or were near a gun when it was fired.

Collection and Packaging of Evidence

Gunshot Residue Kits are provided by the Tennessee Bureau of Investigation Crime Laboratory free of charge. These kits have complete instructions on the proper collection technique included inside. An information sheet is, also, provided within the kit, which should be filled out as completely as possible. When possible, submit a cartridge case from the scene or use the space available on the information sheet to describe the ammunition manufacturer's identifying marks.

Do **not** attempt to make your own kits.

Do **not** allow the subject to remove rings or wash his or her hands prior to collection. Blood and dirt do not affect the outcome of the analysis. Blood stained items must be labeled as a biological hazard.

The officer collecting the samples should wash his/her hands prior to using the kit, or wear gloves.

Analysis of Gunshot Primer Residue on Objects

This analysis is designed to determine the presence of antimony, barium, and lead on items that were near a firearm when it was fired. These objects can include, but are not limited to:

- Suspect's clothing, including gloves;
- Vehicles (from drive-by shootings, etc.); or
- Windowpanes.

It is recommended that if a Gunshot Residue Kit is performed on the hands of a subject, the clothing should, also, be collected. Should the GSR kit be positive for gunshot primer residue, the subject's clothing will not be analyzed.

Collection and Packaging of Evidence

Package all items in sealed brown paper bags. The items must be handled with care, as gunshot residue is fragile evidence that can be easily lost or destroyed. Blood stained items must be labeled as bio-hazardous.

Footwear and Tire Impressions

At many crime scenes, tires and footwear impressions are often as difficult to locate as fingerprints. Proper protection at the crime scene will reduce the chances of additional impressions being made by emergency and investigating personnel. Crime scene officers should seek out this evidence at all crime scenes.

- When obvious footwear and tire impressions are located, check the personnel and vehicles present, as often these impressions can be eliminated. Photograph or print all shoes and tires that are eliminated to keep as a record of this elimination.
- Entrance and exit areas are good places to check for footwear and tire impressions. Sometimes, doors are kicked and times inadvertently stepped on. Consider such possibilities during crime scene processing.
- Check flooring by darkening the room and viewing the area with a flashlight held close to parallel with the floor (oblique lighting).

Shoe Impression Comparisons

Shoe impression evidence at a crime scene can be present in the following forms:

- Shoe impression(s) in mud, dirt or snow,
- Shoe impression(s) in blood or other residue,
- Shoe impression(s) on flooring (latent or in dust), or
- Shoe impression(s) on removable objects.

Shoe impressions recovered from a crime scene or shoe impressions on an object can be compared to known shoes from a subject. If a subject has not been identified and there is sufficient detail in the shoe impression at the scene, a shoe brand name/model may be provided from the Shoeprint Image Capture and Retrieval (SICAR) database.

Collection and Packaging of Evidence

**** No attempts should be made to collect or remove shoe impression evidence from a crime scene *without photographing the print or track first*. This must be performed with a *measuring device visible in the picture frame and with the camera perfectly parallel* over the shoe impression. The impression must fill the picture frame, as much as possible. ****

For shoe impression(s) in mud, dirt or snow, a **dental stone cast** must be obtained. When the cast is hardened, remove it, but do not attempt to clean the cast. Air-dry the cast for 24-48 hours and then package it in a **brown paper bag or a box**. Casts should never be packaged in plastic bags, as the casts may mold and, consequently,

degrade. The casts are very fragile and can break. Care should be taken to package this evidence carefully prior to transporting it to the laboratory.

In cases where shoe impressions are in blood or dirt on objects, such as doors and flooring; these items should be **collected "as is"** and submitted to the laboratory for further enhancement, analysis and comparison. Do not package bloody shoe impressions that are not completely dried. Protect the print in such a way that the impression is not disturbed during transport (such as **a box taped over the print or brown paper covering but not touching the impression**).

Shoe impressions in dust should be collected with an electrostatic lifter or gelatin lifter (remember to photograph first!). These are available at the Nashville, Knoxville and Memphis Crime Laboratories. Electrostatic lifts should be taped into **shallow boxes** with the shoe impression side up, and hand-delivered to the crime laboratory. Gelatin lifters (available through law enforcement catalogs) are temperature sensitive and should be kept out of extreme heat and cold. The gelatin lifts can be packaged in **sealed envelopes or brown paper bags**.

Shoe impressions that are developed using latent print powder can be lifted with wide fingerprint type tape or palm print lifters and secured to a clear document page protector. The lifts can, then, be packaged in **sealed envelopes or brown paper bags**. Once again, remember to photograph prior to attempting the lift.

Papers on a floor at a crime scene should always be collected for shoe impression analysis, even if the print is not visible with the naked eye. The collected papers can be tested at the laboratory for the presence of shoe prints. These papers should **be taped to the bottom of a box** as they were found at the scene (if the two overlap, they should be collected in this orientation).

Subject(s) shoes should be packaged in **sealed brown paper bags**. Blood stained evidence must be labeled as a biological hazard.

Tire Impression Comparisons & Tire Manufacturer and Make Determination

Tire impressions recovered from a crime scene or tire impressions on an object, such as victim's clothing can be compared to known tires from a subject vehicle.

If a subject vehicle is not available and there is sufficient detail in the track at the scene, a tire manufacturer and tire brand name can be provided from a tire tread computer database. If the tire is used only on new vehicles, manufacturer vehicle make and model may be provided. Further information about the tires can be obtained through contact with tire manufacturers.

Collection and Packaging of Evidence

** No attempt should be made to cast tire impression evidence at a crime scene **without photographing track first**. This must be performed with a **measuring device visible in the picture frame and with the camera perfectly parallel** over the shoe impression. **All** suspect tracks present at the crime scene must be photographed in their entirety. If a long stretch of track is available, at least 10 ft. of the track should be photographed to ensure documentation of the full circumference of the tire. **

For tire impression(s) in mud, dirt or snow, **dental stone casts** must be obtained of the entire track. When the casts harden, remove it, but do not attempt to clean the cast(s). Air-dry the cast(s) for 24 to 48 hours, and then package the cast(s) in **brown paper bags or boxes**. The cast(s) are fragile and can break; therefore, care should be taken to package this evidence carefully prior to transporting to the crime laboratory.

In situations where the tire tracks are on objects, such as victim clothing, the item(s) should be collected "as is" and submitted to the crime laboratory. Do not package blood stained clothing until completely dry. Remember: **for hit-and-run accidents** where paint/glass analysis is requested do **not air-dry the clothing** and bring them to the laboratory as soon as possible. Blood stained clothing must be labeled as bio-hazardous. Protect the track in such a way that the impression does not wipe away during transport. This can be accomplished by placing the item, track side up, in a box and hand-deliver to the crime laboratory.

If a subject vehicle is recovered, test impressions of *all of the tires* must, also, be submitted with the tire impressions and photographs from the scene. The subject vehicle can be submitted to the crime laboratory if this technique is unfamiliar. Contact the Evidence Receiving Unit prior to submittal.

Paint

The analysis and comparison of paint evidence can be requested in cases involving:

- Subject vehicle impacting victim vehicle
- Subject vehicle impacting pedestrian
- Subject vehicle impacting stationary object
- Tool impacting stationary object
- Graffiti

Laboratory examination can be performed on both subject and victim paint samples and can be compared based on color, texture, type, layering sequence, pigment and binder compositions.

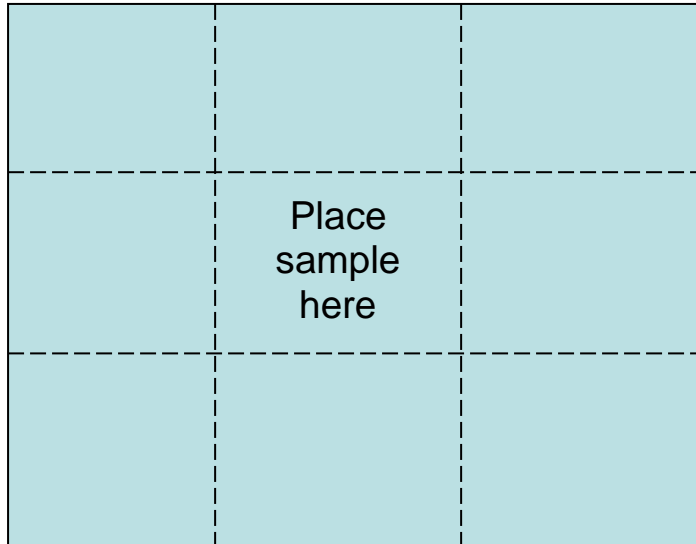
In cases of hit-and-run accidents, paint recovered from victim's clothing and from the scene can be analyzed and this data can be entered into a database that may provide possible vehicle manufacturer's makes and models.

Collection and Packaging of Evidence

Submit all painted evidence recovered from the scene.

In cases where the object is too large to submit, obtain a known paint sample by cutting down through all the paint layers to the object base. Do not merely scrape the surface. Obtain samples from the damaged areas of the vehicle(s). If the damage is to several panels of the vehicle (i.e. hood, bumper, and quarter panel), a sample must be taken from each, as the paint may be different on each panel. If the damage is on a quarter panel that is divided by a molding or pin striping, a sample must be taken above and below the divider.

Place the paint sample in a **piece of paper folded in a druggist folds (see diagram below)**, tape and then **seal within an envelope. Do not put the paint sample directly into an envelope**, as the paint will stick to the adhesive or fall through the corners.



Druggist Fold Directions:

Fold paper first along all dashed lines to form creases.
Place sample in the middle square.
Refold and tape to secure.

Liquid paint samples should be submitted in their original containers. If that is not possible, **pour paint into vapor-tight cans or vials.**

Wet and/or blood stained clothing from victims of a Hit-and-Run accident must never be hung up to air-dry; transport to the crime laboratory immediately for analysis. Blood stained clothing must be labeled as a biological hazard.

Burglary tools, such as screwdrivers and crowbars, may retain paint traces. Whenever possible, submit the entire tool in sealed brown paper bags or boxes. The area with the paint transfer should be protected by placing a piece of paper over the paint and securing all sides with tape.

Glass Analysis and Comparisons

Glass is a rigid, durable material with variation in composition and application which renders it useful as associative evidence. The Tennessee Bureau of Investigation Crime Laboratory provides two types of glass analysis: Glass Fracture Analysis/Order of Breakage and Glass Comparisons.

Glass Fracture Analysis/Order of Breakage

Glass fracture patterns are useful; fractures caused by impact, heat, high velocity projectiles and glass-cutters may each be distinguished. Laboratory examination of recovered shards of glass may reveal the direction and sequence of breaking.

Collection and Packaging of Evidence

Glass found remaining in a broken window should be secured in place with tape to facilitate reconstruction – unless latent print examination is, also, requested. The pane should be **marked as to inside, outside, top and bottom**. Place the pane in a **cardboard box and/or brown paper** and seal to prevent further breakage before transporting to the Crime Laboratory. If a gunshot residue test is, also, being requested avoid handling the glass and protect the pane against abrasion.

Submit all available glass from the inside and outside areas near the window so that the pieces can be fitted together to determine the point of impact. These pieces should be packaged separately from the pane and labeled, as to where they were recovered.

Evidence boxes and paint cans can be used as containers and will guard against possible injury to submitting officer and laboratory personnel.

Avoid the use of paper envelopes to contain loose glass.

Glass Comparisons

When glass is broken, glass particles rebound and shower more than 10 ft. toward the direction of the force. Therefore, glass can be found in the hair and clothing of any individual in the vicinity. Glass particles can, also, be embedded in the objects used to break the glass object. Glass from subject's clothing and the body can be compared to a glass standard from the crime scene.

Collection and Packaging of Evidence

Submit all glass available from the broken object. If multiple glass items were broken at the scene, package each separately in sealed **boxes or paint cans.** **Avoid the use of envelopes** for small pieces of glass.

Check for glass fragments on the subject's hair or in wounds. Collect the subject's clothing, shoes, and any instrument he/she may have used to break the glass. Package the items in **sealed brown paper bags.** Always package subject's clothing and shoes separately.

Fibers

Individual fibers, as well as, larger textile constructions, such as: fabric, carpet, and cordage, may be characterized and compared to corresponding materials recovered from a suspect or his/her environment. Laboratory analysis of fibrous trace evidence is based upon microscopic examination and comparison, in conjunction with instrumental methods.

Fiber evidence can be found at the scene of various types of crimes, such as: murder, rape, burglary, and hit-and-run. A laboratory analysis can associate a subject to a victim, a subject to a location or a victim to a location.

Some types of fiber evidence that may be found at a crime scene or associated with an individual are:

- Clothing
- Carpets
- Bedding
- Fibers in hair, under fingernails, or on the body
- Wigs
- Masks
- Gloves
- Fabric fragments from crime scene point of entry
- Buttons with thread and/or fabric attached
- Ropes and twine
- Tape
- Fabric impressions
- Fibers on weapons
- Fibers under tape
- Fibers on or under vehicles (in hit-and-run cases)

Collect and package fiber evidence as soon as possible to prevent loss or contamination of evidence.

Take precautions to prevent contamination of fiber evidence by following these guidelines:

1. Do not interview the victim(s) and suspect(s) in the same area.
2. Keep the crime scene clear of unnecessary personnel.

3. The suspect should never be brought back to the crime scene prior to recovering fiber evidence.
4. Clothing items from the victim and the suspect should not be allowed to rest on the same surface before packaging.
5. Each item of evidence should be packaged separately as soon as possible.

Collection and Packaging of Evidence

Subject *and* victim clothing should be collected and packaged separately in **sealed brown paper bags**. Blood stained clothing must be labeled as a biological hazard.

Standard or known carpet and fabric samples must be collected from all carpeted and upholstered areas of the crime scene that the subject may have come in contact with. The carpet standards can be packaged in **sealed brown paper bags, film canisters, petri dishes or druggist fold (see "paint" for diagram of druggist fold)**. A standard is not a vacuuming sample from the scene, but rather a cutting taken from the area.

Vacuums from a crime scene or vehicle should be packaged in **sealed brown paper bags** with **all seams** taped to guard against loss of debris.

Indented Impressions

Indented impressions are created when the writing, drawing, typing or printing upon a top sheet of paper imparts an indentation on the sheet(s) of paper immediately below the page bearing the intended image.

Collection and Packaging of Evidence

Do not attempt to enhance indented impressions in the field.

Submit pads of paper, notebooks, or book covers in **sealed brown paper bags**.

Physical Matches

The physical matching of one piece of evidence to another can establish that two items were once joined as one. If an article is randomly separated into two or more pieces during the commission of a crime, a jigsaw fit of the edges can show conclusively that the pieces were once joined.

Automobile parts frequently remain at the scene of car accidents. They may be identified as to type of material, sometimes as to which part of a car, and occasionally, as to the make and year of the car. Physical matches are common and provide proof that a broken part found at the crime scene came from a corresponding broken part from the suspect's vehicle.

Most items can be packaged in sealed brown paper bags.

Sharp items such as glass and knives should be packaged in sealed paint cans or boxes. Blood stained items must be labeled as a biological hazard.

Analysis for Heavy Metals

The Microanalysis Unit can analyze crime related evidence for heavy metals such as copper, lead, cadmium, and arsenic. This analysis is usually performed in conjunction with the Toxicology Unit which will analyze the same evidence for non-metallic poisons and drugs.

The following will be accepted for this type of analysis:

- Blood
- Urine
- Organs from autopsies
- Food items

For other items, prior to submittal, please contact the Microanalysis Unit.

Blood and urine can be submitted in standard hospital collection tubes and containers. The TBI issued Blood Alcohol Collection Kit can be used for the blood samples.

Organs should be double-bagged with a security seal and labeled as "Biohazard." These should, also, be frozen prior to submittal.

Other items should be placed in air-tight packaging, such as glass or rigid plastic containers.

Analysis for Chemical Sprays

This analysis is designed to identify any of the three major components of commercial pepper sprays, which includes:

- Alpha-chloroacetophenone (CN)
- Orthochlorobenzalmalononitrile (CS)
- Oleoresin Capsicum or Capsaicin (OC)

Please package all items that may have come in contact with the above listed sprays in air-tight containers, such as clean paint cans or sealed Ziploc-type bags (double-bagging is recommended). These chemicals are severe irritants.

The manufactured chemical spray container should, also, be submitted with the evidence, if possible. However, if the container is not available, the analysis for the spray is still possible. This information must be placed on the outer packaging.

Tape Comparison

A torn or cut end of tape recovered from a crime scene may be found to physically match the end of a partial roll recovered from the subject(s). In the absence of a physical match, questioned and known tapes may be associated on the basis of common physical construction, color and fiber composition.

Collection and Packaging of Evidence

Tape recovered from a crime scene or victim should be recovered and placed as a unit onto **a clear document page protector or heavy-weight polyethylene bag**. In the laboratory, the tape can be removed and examined for fingerprints and trace evidence prior to tape comparisons. The roll used for comparison to the tape from the crime scene can be packaged in a separate **sealed brown paper bag**.

Hair Collection

The laboratory analysis of hair evidence cannot be performed at the Tennessee Bureau of Investigation Crime Laboratory. It is suggested that these samples be sent by the investigating agency directly to the Federal Bureau of Investigation Crime Laboratory at the following address:

Federal Bureau of Investigation Laboratory
2501 Investigation Parkway
Quantico, VA 22135

The FBI policy dictates that hair analysis and comparisons will not be performed if DNA analysis produced a positive association.

Thirty (30) pulled head and pubic hairs from the subject and victim must be provided to the FBI Crime Laboratory as standards for comparison. These can be packaged in envelopes, sealed brown paper bags, film canisters, petri dishes, or druggist fold (see "paint" for diagram of druggist fold).

The Tennessee Bureau of Investigation Crime Laboratory will send hair to the FBI under the following conditions:

- The hair samples were recovered by the TBI's Violent Crime Response Team.
- The hair samples were recovered from a vehicle submitted to the Crime Laboratory analysis.
- The case is being investigated by the Tennessee Bureau of Investigation.

Explosive Analysis

The Microanalysis Unit will analyze suspect material for the presence of low and high explosives.

This evidence will only be accepted into the laboratory under the following conditions:

All suspected explosive material will be rendered safe by, d the **Tennessee State Bomb and Arson Section, THP Bomb Squad or Nashville Bomb Squad**. They will assist in taking the appropriate sample and properly packaging it for transport.

Toxicology Unit

- If a person has been poisoned by food or medicine, any potential poisons found at the scene (i.e., boxes of rat poisons, etc.) should be collected and preserved by refrigeration or other appropriate means.
- Obtain specimens **as soon as possible** after the offense occurs.
- In the event of a large time lapse between the offense and evidence collection (for example: "date rape/drug facilitated rape"), it is important to collect both blood and urine samples, if possible.
- Try to collect 20 milliliters of blood and at least 20 milliliters of urine.
- Observe the collection of **all** specimens.
- **All containers should be labeled** with subject's name, time, date, etc. as soon as the specimen is collected.
- Specimen containers should be **securely packaged** to prevent leakage and possible cross contamination.
- Fill out alcohol/toxicology request form **clearly** and **completely**. Be sure the subject's name is listed correctly.
- **Listed all suspected drugs** or other substances that may be present.
- Submit specimens to the crime laboratory **as soon as possible** to avoid deterioration of any suspected drugs that may be in the sample.
- Submit all blood using the TBI Blood Alcohol/Toxicology Evidence Collection Kit to the crime laboratory serving your area.
- Blood samples need to be protected from heat. Storage in a refrigerator is recommended.

Capabilities and Services

- Analyses of alcohol in biological samples
- Analyses of drug substances in biological samples
- Analysis of poisons in biological samples
- Analysis of non-taxed alcohol

Toxicology Cases

The Toxicology Unit will not routinely screen blood for drugs in DUI cases where the blood has an alcohol concentration at or above the statutory minimum to show impairment (0.08 grams of alcohol per 100 milliliters of whole blood).

The Toxicology Unit does not conduct employee screening for controlled substances or participate in drug monitoring programs. Blood or urine samples related to such programs will not be accepted for analysis.

Poison Cases

- If a poison has been administered to a person, the Toxicology Unit will attempt to confirm the presence of that poison. The number of potential poisons is large, and it is crucial for the investigating officers to provide the laboratory with information concerning the specific poison suspected and the circumstances surrounding the suspected poisoning.
- If a person has been poisoned by food or medicine, collect any available leftovers and preserve them by refrigeration or other appropriate means (i.e., ice chest).
- Carefully evaluate the circumstances surrounding the suspected poisoning. The Toxicology Unit does not analyze for bacterial toxins which occur when food spoils. County Health Departments, the Tennessee Department of Health Laboratories, and the Tennessee Department of Agriculture Laboratories analyze for bacterial toxins.
- Be certain that evidence submitted for analysis has some reasonable basis for submission based on investigation and crime scene processing. Domestic disputes and complaints of bad-tasting food or beverages do not warrant the submission of items to the laboratory.

Evidence Submission Guidelines

The Toxicology Unit accepts evidence if a criminal arrest has been made or is anticipated. Evidence from concerned parents, schools, organizations, private citizens, and evidence that has no value for criminal prosecution will not be accepted.

- All criminal evidence types normally mailed, including TBI evidence collection kits, such as: Blood Alcohol/Toxicology, DNA, Sexual Assault Evidence Collection, Buccal Swab Collection or Gunshot Residue Kits will only be accepted if properly packaged and from a commercial carrier that provides transfer documentation, such as: the US Postal Service Registered and Express Mail, UPS and Federal Express.
- Personal delivery represents the safest method of submitting evidence to the laboratory.
- You should familiarize yourself with and follow the instructions listed on the back of the Alcohol/Toxicology Request for Examination form.
- Obtain specimen(s) **as soon as possible** after the offense occurs.
- Try to collect 20 milliliters of blood and at least 20 milliliters of urine.
- Personally observe the collection of **all** specimens.
- **All containers should be labeled** with the subject's name, time of sample collection, date of sample collection, etc. as soon as the specimen is collected.
- Specimen containers should be packaged to prevent leakage and possible cross contamination.
- Fill out the alcohol/toxicology request form **clearly** and **completely**. Be sure the subject's name is listed correctly.
- **List all suspected drugs** or other substances that may be present.

- Submit specimens to the crime laboratory **as soon as possible** to avoid deterioration of any suspected drugs that may be in the sample.
- Submit all blood using the TBI Blood Alcohol/Toxicology Evidence Collection Kit to the laboratory serving your area.
- Be sure the person taking the blood sample **does not leave** the needle or other unnecessary items in the kit.
- Use the protective packaging, included with the kit for submission to Toxicology.
- Blood samples need to be protected from heat, and storage in a refrigerator is recommended.
- After the analysis is completed, biological samples are retained in the laboratory for a period of at least sixty days and then destroyed. Samples can be retained with court order.

Report Interpretation

The Toxicology Unit reports analysis results, as follows:

- Blood-alcohol concentrations are reported in gram percent (grams of alcohol per 100 mL of sample).
- Alcohol concentration for liquor submission is reported as a percent by volume. To convert the concentration to "proof," double the percent concentration (e.g., 80 percent by volume equals 160 proof).
- Drug concentrations are reported in µg/mL (micrograms per milliliter of specimen) or in ng/mL (nanograms per milliliter of specimen).
- Drugs are reported as positive when quantitative results cannot be obtained due to poor sample condition, insufficient sample for quantitative results, chromatographic conditions, etc.

Breath Alcohol Calibration Laboratory

The TBI's Breath Alcohol Unit is responsible for the issuance and maintenance of all state breath alcohol instruments. The unit's forensic scientists certify operators to perform tests on instrumentation and testify in court when needed. If an agency would like to obtain an instrument and training free of charge, please contact Samera Zavaro at: samera.zavaro@tn.gov

iResults

All TBI laboratory reports are issued through the internet program iResults. Each submitting agency will have an administrator whom is responsible for setting up users to retrieve their reports. If your agency needs a new administrator or has questions regarding iResults, please contact Samera Zavaro at: samera.zavaro@tn.gov