Tarrant County Medical Examiner
and Forensic Laboratories

Laboratory Services Handbook

For the most current version of this document, please see

http://www.tarrantcounty.com/eMedicalExaminer
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INTRODUCTION

The Tarrant County Office of Chief Medical Examiner (TCME) is a regional medical examiner’s facility located in Fort Worth, TX. The four county Medical Examiner’s District represents a core population of approximately 2.75 million citizens. The office has a staff of board certified forensic pathologists, an around-the-clock investigative staff, and a full complement of forensic laboratory services. The Forensic Laboratories are divided into Criminalistics and Toxicology sections.

The facility provides laboratory examinations to support Medical Examiner autopsy services within the Medical Examiner District, as well as fee-for-service laboratory analysis in response to law enforcement, attorney, or other requests from both within-District and non-District entities across Texas or the United States. Texas Government Code 411.0205 requires that specific forensic testing of evidence is conducted in an accredited laboratory in order for testimony to be admissible in Texas courts. The Forensic Laboratories are accredited by the Texas Department of Public Safety (DPS). A description of the state accreditation program may be found on the Texas DPS website: www.txdps.state.tx.us.

The Laboratory Services Handbook is designed to acquaint law enforcement and other personnel with the services offered by the Forensic Laboratories, and to assist in the proper submission of evidence. We will work with submitters to protect the integrity of all evidence and to ensure the reliability of all examinations conducted.
GENERAL POLICIES

Laboratory accreditation standards emphasize service to the customer, and throughout this document, the requestor or submitting agency may be referred to as “customer.”

The Forensic Laboratories value communication and cooperation with customers in an effort to provide the highest quality of service. The laboratory staff may communicate with the customer at any point in the examination process in order to clarify service requests, obtain information on the nature/source of the evidence, suggest modifications to requests based on the anticipated probative value of the requested analysis or examination, provide clarification of results and interpretations, or for other questions that arise. Customers may also contact the laboratory staff for any questions or clarifications before, during, or after the examination process. A listing of contact information is found below:

**Physical Address:**
Tarrant County Medical Examiner
200 Feliks Gwozdz Place
Fort Worth, TX 76104

**Main Contact Information:**

**Phone 817-920-5700**
Laboratory Fax: 817-920-5719

**Laboratory Secretary: x 8335**
Evidence Department: x 8357
Business Manager: x 8331

**Criminalistics Laboratory:**
Laboratory Director: x 8370
Quality Manager x 8360
DNA Laboratory: x 8518
Firearms Laboratory: x 8520
Latent Prints Laboratory: x 8385
Trace Evidence Laboratory: x 8521

**Toxicology Laboratory:**
Chief Toxicologist: x 8396
Quality Manager x 8360
Forensic Toxicology: x 8514
Drug Chemistry: x 8517
Breath Alcohol: x 8386

Any submission of physical evidence by a customer serves as a “request” for laboratory services. The initiation of a chain of custody along with the evidence represents the contract for testing between the customer and the TCME. Specific requests for examinations to be conducted on individual items of evidence can be indicated in the appropriate area on the chain of custody, or submitted on separate documentation generated by the customer.

An initial review of the packaged evidence and laboratory requests will be made by the Evidence Custodian to ensure that the Chain of Custody is completed in full and contains all required information. At this time, the TCME will tender a response to the request by assigning a case number and determining laboratory assignments for analysis.

Service requests may require an additional review by the assigned analyst, in consultation with the submitting agency, to obtain additional information and to discuss the limitations, timeframe, or resources available for testing and to determine that the needs of the customer can be met. The customer will be informed if the laboratory is unable to meet their needs.
It is the responsibility of the customer to effectively communicate any special service requests, court deadlines, or time constraints for analysis. If the laboratory cannot complete the analysis in the requested time frame, the customer will be notified before examination commences. Delays in routine casework will not typically result in communication with the customer. Should a significant delay occur, laboratory management may choose to communicate with the affected customers.

If the laboratory believes that the evidence is not suitable for testing due to its condition, or a requested analysis is of limited value, the laboratory has the discretion to refuse testing and to determine the most probative tests to perform in response to a service request. The laboratory report will indicate which items were not tested in this scenario.

All testing will be performed using methods accepted by the forensic community and meeting the requirements of the laboratory’s accrediting body and the needs of the customer. TCME reserves the right to determine the most appropriate methods to be used to fulfill the service request in the analysis and examination of evidence, and to provide the most probative information concerning that request. Prior to testing, the customer will not normally be informed of the specific methods to be used; those methods are available for review by the customer upon request.

When analyzing single exhibits that contain multiple units (pills, tablets, baggies, etc.), a statistically valid sampling plan may be used to analyze a portion of the units from that exhibit. The use of the sampling plan allows the reporting of results as representative of the entire exhibit. The customer will not necessarily be informed that a sampling plan was utilized; documentation of the sampling plan used in the case is available for review upon request.

It may be necessary for analysts to collect samples from items of evidence in order to properly preserve or analyze that evidence (cuttings, lifts, swabbings, scrapings, test fires, etc.). These samples may be retained by the laboratory, or may be returned to the customer as dictated by laboratory procedure. The disposition of all evidence generated by the laboratories will be communicated to the customer.

In order to maintain the integrity of the evidence, the confidentiality of all results, and security within the facility, customers are not routinely permitted to witness the examination of evidence. Laboratory staff is available to the customer upon request to discuss potential testing or any results or conclusions.

The Forensic Laboratories encourage feedback concerning the services provided. Customers are encouraged to complete a Customer Satisfaction Survey should they feel the need to communicate, comment, or suggest improvements to laboratory services. A Customer Satisfaction Survey is included with each mailed laboratory report, but is also available in the Evidence Department or can be provided upon request of the Business Manager.

A fee schedule detailing the cost of all laboratory services can be obtained by contacting the Business Manager at 817-920-5700, x 8331.
General Information – Evidence Submission

All evidence intended for analysis should be submitted to the laboratories through the TCME Evidence Department. The entrance to the Evidence Department is located on the west side of the facility; parking for Evidence drop-off is available on Saint Louis Ave immediately to the west of the building. The hours of operation for evidence submission are Monday through Friday, 9 am to 4 pm. The TCME facility follows the Tarrant County Holiday schedule, which can be accessed at http://www.tarrantcounty.com

Evidence may be submitted in-person or by a parcel service such as United Parcel Service (UPS), Federal Express (FedEx), or certified United States mail. When submitting evidence via a parcel service, please ensure that a memo detailing the submitted evidence and requested analysis is affixed to the outside of the sealed submission box or envelope so that the Evidence Department can access the documentation without breaking the evidence seals. Any evidence submitted in this fashion must be clearly marked: Attention: Evidence Department.

Evidence associated with a Sexual Assault should also be submitted with the appropriate Certification of Investigation form, available from the Evidence Custodian. Sexual Assault Kits are routinely retrieved by TCME staff from secured lockboxes at three local area hospitals. When kits are received in this manner, the investigating agency of record will be contacted to obtain authorization to process the kit evidence; if a response has not been received from the agency within 30 days of the first contact, the kit will be returned to the agency unworked. The kit may be resubmitted with a request for examination should examination be required. Alternately, agencies may also submit blanket authorizations to TCME for testing of all kits routinely retrieved in this manner.

Best practices for packaging of evidence include the following:

- Package all evidence and seal the container to prevent loss, cross-transfer, contamination, or deleterious change
- If at all possible, wet evidence (e.g., bloody clothing) should be dried prior to submission. The evidence should be maintained in a secured area and protected from heat, direct sunlight, and contamination during the drying process.
- If the submission of wet evidence cannot be avoided, contact the appropriate laboratory section directly to discuss packaging procedures prior to submission
- Package items separately and avoid comingling items to prevent cross-contamination
- Use a biohazard label when biological material is present
- Use butcher paper for wrapping evidence or for padding in the evidence container
- Use paper bags, manila envelopes, cardboard boxes, and similar porous materials; the use of plastic bags is strongly discouraged
- Seal the package in such a manner that opening it causes obvious damage or alteration to the container or its seal
- Each package should be sealed with evidence tape or heat seals; if possible do not use staples. Mark across the seal with the sealer’s identification and the date.
- Unload and make safe all firearms; place all firearms submitted into a cardboard gun box if at all possible.
- Label items and containers according to your agency policy and procedures.
LABORATORY SERVICES

Specialized sections of the Crime Laboratory include DNA/Forensic Biology, Firearms and Toolmarks, Latent Prints, and Trace Evidence. These services are also supported by a Forensic Photography section.

Testing performed by individual sections includes:

DNA/Forensic Biology
- Body Fluid Identification (Serology)
- Nuclear DNA analysis, including both autosomal (STR) and Y-STR analysis

Firearms/Toolmarks
- Firearms
- Toolmarks
- Distance Determination
- Serial Number Restoration
- Fracture Match/Physical Fit

Latent Prints:
- Latent Print Processing
- Latent Print Comparisons

Trace Evidence:
- Primer Gunshot Residue Analysis (GSR)
- General Trace Evidence Collection (Bodies, vehicles, clothing, bedding, etc.)

Specialized sections of the Toxicology Laboratory include Forensic Toxicology, Drug Chemistry, and Breath Alcohol.

Categories of testing for the individual sections include:

Forensic Toxicology:
- Human Performance Toxicology (typically DWI or Sexual Assault investigations)
- Post-mortem Forensic Toxicology

Drug Chemistry:
- Controlled Substances
- General Chemical Testing

Breath Alcohol:
- Calibration of Breath Alcohol Measuring Instruments

More detailed information concerning specific laboratory services can be found in the sections that follow.
DNA/FORENSIC BIOLOGY

General Information

The TCME DNA/Forensic Biology laboratory provides serological case screening for the presence of blood and semen as well as STR-based DNA testing from probative evidence items submitted from criminal and other official investigations. Examinations and analyses performed will be based on factors such as the type of case submitted, the probative nature of the evidence item(s), and the quantity and/or quality of biological material detected. Consultation with the submitter and/or applicable District Attorney’s Office may be necessary in determining the number of items/samples tested and/or granting permission for the consumption of evidence/sample when only a limited quantity of biological material is present.

Successful DNA results are dependent on the quantity and/or quality of the biological material. Factors such as extreme environmental conditions to which the material has been exposed, substrate on which the material is found, and the exposure of the sample area to multiple individuals may affect DNA results and should be considered prior to submitting evidence for processing. For example, unless injured and possibly bleeding, interpretable DNA profiles from a suspect(s) / handler are typically not obtained from items such as:

- Door knobs/handles, vehicle door handles, gear shifts and console knobs
- Cartridges, ammunition and fired projectiles
- Fingerprints / “oily” smudges
- Victim clothing / pockets “rifled” through by a suspect to remove or search for items

Interpretable DNA profiles are more likely to be obtained from items such as:

- Blood or semen stains
- Saliva sources (cans, bottles, chewed gum, cigarette butts, straws etc…)
- Oral contact areas (bite marks, neck/breast swabs etc…)
- Envelope flaps/stamps (if licked type)
- Epithelial cell sources – to determine wearer (hats, gloves, bandanas, clothing etc…)
- Condoms – to associate to both wearer and / or victim
- Weapons – to determine handler (gun grips, knife handles etc…)
- Ligatures
- Hair with root material

Safety Considerations

At a minimum, latex, nitrile or other non-porous polymer gloves must be worn when recovering and packaging biological evidence. Additional personal protective equipment such as eye protection, face masks, head/hair covering, and lab coats may be beneficial for personal safety and to avoid contamination of the evidence.

All biological stains and reference samples should be treated as a biohazard (Universal Bloodborne Pathogen Precautions). These samples could potentially expose the handler to HIV, Hepatitis B and C, or other pathogens.
Liquid blood/urine samples must be packaged in a manner which minimizes the possibility of breakage. The container cap/ tube septa must also be securely sealed to minimize the possibility of leakage during transport.

**Collection – General**

The use of proper collection and evidence handling procedures reduces the possibility of the introduction of extraneous DNA and degradation of DNA. The following guidelines should be followed:

- Care must be taken to avoid the inadvertent mixing of reference standards with questioned samples (example: buccal swabs and swabs from crime scenes).

- Package individual items of clothing from the same person in separate clean unused containers, preferably sacks or cardboard boxes.

- Do not package evidence items from different individuals in the same containers (example: suspect’s clothing with victim’s clothing).

- Wear gloves and change them often or when they become soiled. When handling items that are heavily blood stained/soiled, gloves should be changed between every item collected / packaged.

- If biological evidence is going to be collected with a pair of forceps or tweezers, the forceps/tweezers should be cleaned with an approximately 10% solution of bleach (or other decontaminating solution such as “DNA-Off”) followed by de-ionized water prior to use and between each item collected.

- Avoid talking, coughing, or sneezing over the unpackaged evidence if a disposable face mask is not worn during collection.

**Preservation and Packaging**

- Paper packaging such as sacks, envelopes and cardboard boxes are recommended to minimize the possibility of degradation of biological material. Plastic packaging, however, is acceptable for liquid blood tubes and urine containers.

- For large or bulky packages (bedding, shotguns etc…) cover all open ends with packaging tape followed by pieces of evidence tape in selected areas.

- Clearly mark contents on outer packaging including location of recovery (example: “bloodstain from broken glass at point of entry”)

- When packaging, do not use masking tape and use a minimum number of staples, if necessary.

- Place a piece of tamper resistant evidence tape across the seal. Initial and date the seal.

- Avoid the excessive use of evidence tape. Evidence tape should be used to detect tampering, not as the sole sealing device.

- Wet stains/clothing should always be air dried at room temperature before packaging to avoid degradation of biological material. If this is not possible, the laboratory should be consulted prior to submission of the item(s).
Avoid storage of biological evidence in sunlight, high temperatures and/or humidity before submission to the laboratory. If possible, store packaged items in a cool, dry area.

If possible, all firearms must be unloaded prior to submission. If this is not possible, you must inform the evidence custodian of the firearm’s loaded condition upon submission. A TCME qualified firearms examiner should be consulted to assist in the disarming of the firearm prior to release to the evidence custodian and/or serology / DNA section. Alternatively, the firearms examiner may elect to receive the item directly and then release to the serology / DNA section after it is rendered safe to handle.

- Do not cover or wrap knife blades and/or handles in tape if these areas are being requested for serology or DNA examinations or testing.

- If the exact location of evidentiary DNA on an item is important, wrap the item in clean paper and roll it up on itself prior to placing in outer packaging in order to prevent transfer of evidence from one location on the item to another location.

**Collection of Evidentiary Samples**

- Visible wet stains of possible probative value that may not be visible after drying (example: semen stain on bedding or clothing) should be circled with a permanent marker to aid in directing the analyst to the area of interest.

- Some stains from non-absorptive surfaces such as on wall paneling, flooring, car parts, glass, plastic etc. can be lifted using sterile swab(s) wetted with a minimum amount of sterile or de-ionized water. The swabs should be wet but not over saturated or dripping.

- If sufficient stain is available, two swabs should be collected together from the area so that an approximate equal staining of each swab is obtained. One swab is acceptable if only a limited quantity of stain is available.

- After transport to an adequate facility, if collected in the field, the swabs should be air dried and placed in a paper sleeve, swab end first. Label the outside of the paper sleeve, as well as outside packaging, with the recovery location and other relevant chain of custody information.

- Swabs should be collected only with sterile (if available) or de-ionized water. Do not use saline, Lactated Ringers or any other buffered solution. These types of solutions may inhibit recovery and amplification of the DNA.

- Scrapings from dried stains are not recommended. Swabbing is the preferred method of collection of dried stains from non-absorbent surfaces. Scrapings from dried stains can flake and become static making the particles very difficult to isolate.

- Be mindful of contamination when collecting minimum quantity blood stains from areas that have been processed with black fingerprint powder. The inadvertent introduction of extraneous DNA from previously processed blood stained items or crime scenes may be possible if the same black powder batch, container, or brushes were utilized in previously processed items or crime scenes.
- Individual cuttings may be collected and submitted from stains or areas of interest from large items such as walls, car seats and carpet.

- Document the location of recovery of all evidentiary items with enough detail as to aid the analyst in selecting the most probative items that require examination or DNA testing (e.g., victim’s bed, suspect’s residence, dumpster in flight path one block from crime scene, front porch of burglarized residence) This information is requested with submission of all evidentiary items and is required for determining eligibility of DNA profiler prior to entry into the Combined DNA Index System (CODIS).

Sexual Assault Evidence

- Sexual assault evidence collection kits (SAK) should only be collected by a qualified Sexual Assault Nurse Examiner (SANE) or other qualified individual trained in the recovery and packaging of sexual assault evidence. In addition, a completed Physical and Sexual Abuse Medical Protocol or other acceptable hospital sexual assault examination documents is required with submission to the TCME Office. This document contains the necessary information the laboratory requires in order to enter the case into the TCME Lab Management Information System (LIMS) and proceed with serological or DNA testing.

- If a male suspect is apprehended within a relatively short time period of the reported incident and it is reasonable to assume that he has not bathed or showered, two penile swabs should be collected together (not one at a time) using sterile (if available) or de-ionized water to lift possible epithelial cells originating from the victim. Follow packaging guidelines outlined below in the “Collection of Reference Sample” section.

- Currently, TCME sexual assault evidence collection kits (SAKs) are provided to John Peter Smith Hospital, Texas Health Harris Methodist Hospital, and Cook Children’s Hospital in Fort Worth and contain the necessary components requested by the laboratory for testing. These SAKs are deposited in a locked drop box at the hospital and are retrieved by TCME staff on a routine basis. If a TCME SAK is not utilized, and depending on assault details, the following sealed items are generally required:

  - Two buccal swabs from victim – or EDTA blood tube if incapacitated
  - Four vaginal swabs and one vaginal smear
  - Two vulvar swabs
  - Four oral swabs and one oral smear
  - Four anal swabs and one anal smear
  - Two peri-anal swabs
  - Oral contact swabs (area clearly documented on envelope)
- Swabs or stains collected from body surfaces should be collected only with sterile (if available) or de-ionized water. Do not use saline, Lactated Ringers or any other buffered solution. These types of solutions may inhibit recovery and amplification of the DNA.

- Although refrigeration is not required, the SAK should be submitted to the TCME evidence custodian as soon as possible if it contains liquid samples such as blood and urine. Liquid blood specimens should not be frozen prior to submission. Avoid storing SAKs in sunlight, high temperatures or humidity; if possible, store in a cool, dry area.

- In additional to the SAK, some smaller clothing items, such as under garments, may be received via the hospital locked drop box. Processing of these items, as well as additional items submitted via the evidence custodian, will be dependent upon the provided case details and results of the SAK screening.

- Urine samples submitted with the SAK will be released to the TCME evidence custodian for release to the Toxicology section.

**Collection of Known Reference Samples**

When possible, buccal swab collection is the preferred sampling method for DNA testing.

- Wear gloves during the collection and packaging process.

- Collect either two or four swabs from each victim, suspect or elimination individual.

Open the sterile swab package and have the individual swab the inside cheek of the mouth with each swab collected, followed by additional swabbing of the other cheek.

Prior to packaging, it is preferable to air dry the swabs, while ensuring that the swabs do not contact any other surface before inserting the swabs back into the swab package.

It is permissible; however, to package without air drying by inserting, swab end first, back into the sleeve of the swab package.

- Label the paper sleeve with the name of the individual and package the swab package in an envelope also labeled with the donor’s name and other relevant chain of custody information. Seal the envelope with evidence tape, and initial and date the seal.

- Never place swab packages (paper sleeves) from more than one individual in the same envelope.

- If an individual is incapacitated for some reason and buccal swab collection is not possible, a purple top (EDTA) tube should be collected and submitted. If toxicology testing is needed, a grey top tube is also requested.

- Liquid blood specimens should be refrigerated until submission to the laboratory, if possible.

- Information of suspected blood transfusions of the individual should be provided to the laboratory.
Scope of Services

The following services may be requested when submitting evidence for serological screening or DNA examination:

- Presence of blood and/or semen
- Presence of human DNA
- Presence of male DNA
- Comparison of questioned and known DNA profiles
- DNA testing for entry into the COmbined DNA Index System – no suspect cases
- Examination of items / collection of samples for preservation and possible future testing

In addition to nuclear (autosomal) STR - PCR based testing, the TCME Office DNA laboratory also offers Y-STR testing for the detection of male DNA. Y-STR testing is appropriate in cases in which there is a minimal quantity of male DNA in the presence of a high concentration of female DNA. This testing targets genetic locations only on the Y- chromosome, producing a Y-STR profile (haplotype) which makes interpretation of the non-victim component more likely. Examples may include:

- Male DNA from bloodstained fingernails from a female victim, making the assumption that the majority, if not all, of the blood is from the victim.

- Male DNA from contact areas from specimens collected from female body parts.

- Male DNA from vasectomized (or very low sperm producing) individuals collected from female victims. This may be the required testing option when prostatic antigen (P30), a component of semen, has been detected but spermatozoa have not been identified.

The DNA laboratory currently does not offer mitochondrial DNA (mtDNA) testing or paternity testing.

A serology laboratory report will be issued outlining the items received, items examined, and the results of any presumptive and confirmatory testing conducted. A DNA laboratory report will contain the items received, samples collected, items tested, and the results/conclusions including comparisons to known samples submitted. Additionally, statistical data is reported to support reported associations, and CODIS entry statements (if applicable) will be included. When eligibility and minimum data requirements are met, DNA profiles can be searched at local, state and national levels for the purpose of generating investigative leads.
Submission of Biological Evidence

- For bulky items, such as bedding, mattresses, car seats, doors, section of walls etc., please consult with the laboratory to discuss testing requests and options before submission to the TCME Office.

- If a large number of items are delivered to the evidence department for serology or DNA testing requests, the evidence department will generally request the submitter to remain at the TCME Office while the laboratory is contacted to discuss which items are the most suitable or probative for testing. It is therefore highly recommended that the DNA/Forensic Biology section is contacted to discuss testing requests prior to the submission of items.

- Items selected for testing will be based on the probative nature of the item, the analyst’s experience, knowledge and training and if necessary, consultation with the submitter or applicable District Attorney’s Office.

- When possible, all relevant known reference specimens (buccal swabs) are normally required before DNA testing can be started including any elimination individuals and consensual partners in sexual assault offenses. This will substantially assist in the completion of testing, comparison of DNA profiles and final reporting in a timely manner. Reference specimens (or additional reference specimens) submitted after DNA testing has been started on the evidentiary items may significantly extend the time of case completion and delay final reporting.

- When submitting evidentiary items that may generate DNA profiles eligible for CODIS entry or “no suspect” unsolved cases specifically for the purpose of CODIS entry, the following information is required and can be communicated in memo format along with the evidence. Failure to submit this information will require the analyst to contact the submitting agency and may delay processing of items.

  - How are the item(s) / sample(s) associated with the offense?

  - Specifically, where was the item recovered in relation to the crime scene?

  - Have the victim(s)/owner(s) been interviewed to eliminate them as potential DNA contributors (when applicable)?

  - Is there a reasonable assumption based on the investigation that the item / DNA can be associated to the perpetrator? Explain.

  - Investigator name, phone & fax numbers, mailing & and e-mail addresses. This is required information in the event of a CODIS match.

- If a suspect name is available and a request is made for DNA testing, known buccal swabs from the suspect, when possible, are normally required for comparison. Direct comparison to a specific individual known to have a DNA profile in the State Offender Database is not possible. However, eligible DNA profiles developed from evidentiary items can be uploaded into CODIS to be search against local and state casework databases as well as state and national convicted offender databases for the purpose of generating investigative leads only.
- Agencies will be notified of all CODIS matches of possible investigative value (case-to-case, case to Offender, and case to Arrestee).

**CODIS Procedures – Offender/Arrestee Hits**

Should a confirmed match occur between an evidentiary DNA profile (source previously unknown or unconfirmed) and an Arrestee or Convicted Offender profile (state or national) the following protocol is routinely followed:

- The agency investigator is notified (phone or e-mail) that a match has occurred and the current agency contact information (investigator name, address, phone & fax) is verified.

- The DNA laboratory will notify the Convicted Offender laboratory (state or national) that confirmation of the individual’s profile is requested and submit the required documentation. The offender (State) laboratory will confirm the offender (or arrestee) DNA profile and issue a letter which includes the name of the individual as well as other identifying information. This letter will be forwarded to the agency investigator by either the Texas DPS Offender laboratory or the TCME DNA laboratory.

- Confirmation requests are made for all matches in which the source of the profile is unknown or has not been confirmed in-house, such as instances when only a suspect name is provided with the submission and a buccal specimen from that individual has not been submitted. The confirmation request shall be made with the State lab regardless of the investigation status or the offense statute of limitation.

- If necessary, the CODIS Offender Report with the individual’s name can then be used for probable cause to obtain a search warrant for the purpose of securing a known buccal specimen from the individual. The CODIS match and offender’s name alone cannot be used for indictment and / or trial purposes.

- After obtaining a buccal specimen from the individual, it should be submitted to the TCME DNA laboratory (with the corresponding crime lab number) for in-house verification. A report will be issued including statistical data to support the association. This report can then be used for indictment and trial purposes.

**CODIS Procedures – Case-to-Case Matches**

- Should a confirmed CODIS match occur between evidentiary DNA profiles from different offenses (either within or between agencies), the TCME submitting agency(s) assigned investigator will be contacted and provided the match and offense information for their offense(s). In addition, they will be provided with the offense and investigator contact information for the corresponding matching DNA profile, so that the law enforcement investigators can contact each other. This information will be provided to each involved agency for their records and possible investigative purposes, regardless of whether the offense(s) is solved or unsolved.
Policy on DNA Analysis of Hairs

The laboratory will perform DNA analysis only on hairs which meet all of the following acceptance criteria:

- Hairs must be microscopically characterized with a suitable root identified by a qualified trace analyst or hair examiner prior to DNA analyses;
- Hairs must be microscopically compared to all available known reference hairs (victim, suspect, elimination, etc.) prior to DNA analyses. Exceptions will be made only with documented approval of the submitting agency and/or applicable District Attorney’s office. In these instances, the requestor shall be notified that should the analysis not produce a profile of value, that hair will no longer be suitable for subsequent microscopic examination.
- Hairs previously mounted for microscopic examination purposes must be demounted by a qualified trace analyst or hair examiner prior to submission to the TCME DNA/Forensic Biology laboratory. Only un-mounted hairs will be accepted for DNA analysis.
FIREARM/TOOLMARK LABORATORY

Scope of Services

The following general services may be requested when submitting evidence to the Firearm & Toolmark Section:

- Firearm examinations and function testing, including overall and barrel length measurements
- Ammunition or ammunition component examinations and microscopic comparisons
- Restoration of obliterated serial numbers
- Determination of shooting distance based on the presence of gunpowder residues or shot pellet spread
- Toolmark examinations (bolt cutters, pry bar, knives etc.) and microscopic comparisons
- Fracture matching / physical fit
- Production of test exemplars for preservation and possible future testing

A detailed laboratory report will be issued outlining the results and conclusions related to the items received and tested. Upon request, the examiners will meet with law enforcement agents and attorneys to discuss crime scene details and services that could be performed to aid the investigation.

<table>
<thead>
<tr>
<th>Items for examination</th>
<th>Possible determinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet</td>
<td>· Caliber&lt;br&gt; · General Rifling Characteristics and potential make / model&lt;br&gt; · Type of firearm designed for use&lt;br&gt; · Possible design and manufacturer</td>
</tr>
<tr>
<td>Cartridge case/shotshell</td>
<td>· Caliber / Gauge&lt;br&gt; · Potential make/model of firearm&lt;br&gt; · Type of firearm designed for use&lt;br&gt; · Possible design and manufacturer of ammunition</td>
</tr>
<tr>
<td>Fired bullets and/or cartridge cases PLUS a firearm</td>
<td>· See bullet and cartridge case (above)&lt;br&gt; · If fired from the recovered firearm</td>
</tr>
<tr>
<td>Multiple bullets and/or cartridge cases and NO firearm</td>
<td>· See bullet &amp; cartridge case (above)&lt;br&gt; · If fired from one or multiple firearms</td>
</tr>
<tr>
<td>Shot pellets and shot wad(s) Buckshot and slugs</td>
<td>· Size and composition of pellets and buckshot&lt;br&gt; · Gauge of slug&lt;br&gt; · Gauge of wad&lt;br&gt; · May be possible to determine design style and the manufacturer&lt;br&gt; · May be possible to determine the size of the pellets loaded in the wad&lt;br&gt; · May be possible to compare plastic wads to shotguns</td>
</tr>
</tbody>
</table>
Clothing or other objects PLUS firearm and ammunition

- Approximate distance from muzzle of firearm to target

Firearm

- General condition and functionality
- Amount of force required to pull the trigger
- Test fire to obtain exemplars for comparison
- Restoration of obliterated serial numbers
- Document safety features, alterations and/or modifications such as barrel and overall length

Unfired Cartridges or Shotshells

- Caliber and gauge
- Design similarities to other ammunition submitted in case
- Whether the ammunition has marks of value for comparison
- May be able to determine whether it was cycled through the action of a particular firearm

Evidence bearing toolmark PLUS tool

- Determine if tool produced the questioned toolmark

Evidence bearing toolmark and NO tool

- May be able to determine type of tool that made the mark

**Firearm Examinations**

Firearm examinations are requested on any fired evidence and/or any firearm related evidence when the primary concern is to determine whether or not a particular firearm was used in the commission of a crime. Commonly submitted items include pistols, revolvers, shotguns, rifles etc. Commonly submitted objects for comparison include bullets, cartridge cases, shotshells, pellets, wads, cartridges etc.

To ensure the safe handling, storage and submission of firearms, these steps and safety tips should be followed:

- Package and submit an unloaded firearm. It is your responsibility to render the firearm safe prior to delivering it to the TCME facility.

- If possible, label the outer package with a phrase such as “weapon secured”, “rendered safe” or “firearm unloaded” as a visual aid for the laboratory staff handling the package prior to its arrival in the Firearm Section.

- If you must submit a loaded firearm, the Evidence Department personnel accepting the evidence must be notified of its loaded condition. Calling the Firearm Section ahead of your arrival will allow an examiner to be prepared to aid you with unloading the weapon.
Under no circumstance should a loaded firearm be submitted via certified mail or any other shipping service.

At a minimum, latex, nitrile or other non-porous polymer gloves must be worn when recovering and packaging evidence that is soiled with body fluids. Additional personal protective equipment may be beneficial for personal safety and to avoid contamination of the evidence.

Firearms with suspected blood or “blow back” should be labeled as “Biohazard”

All biological material should be treated as a biohazard. Biological material could potentially expose the handler to HIV, Hepatitis B and C, or other pathogens.

Do not insert metal (such as a wire tag) into the firearm barrel or action.

If your agency requires the action to be locked open, use plastic zip ties.

When submitting auto-loading firearms such as pistols, shotguns and rifles, a plastic zip tie inserted through the magazine well and out the ejection port will allow all analysts to verify that that firearm is unloaded.

When submitting revolvers, a plastic zip tie loosely attached through one chamber of the cylinder will keep the cylinder from closing. This will allow all analysts to verify the firearm is unloaded.

Collection

Marking of firearms prior to laboratory submission should utilize ink, rather than scribing or other marking methods.

Scribing bullets, cartridge cases and ammunition is strongly discouraged. Additional marks added during the collection process may overwrite the microscopic marks or patterns needed for the comparison analysis. If your agency requires the object to be marked, use ink only.

If there is any possibility that your agency will request DNA, latent print processing or trace evidence collection from a firearm or firearm related items, each individual who collects, handles, or unloads the item must wear a clean pair of gloves and minimally handle the operating surfaces of that item. Remember that when handling items that are blood stained or soiled, gloves should be changed between every item collected and packaged.

Biological fluids can and do rust firearms. Rusted barrels typically cannot be identified back to fired bullets. Therefore, it is important that you notify the firearm section upon submission of a firearm that is “covered in blood” or “heavily soiled with blood”.
Preservation and packaging

Paper packaging such as brown paper bags, manila envelopes, small cardboard boxes and cardboard gun boxes (handgun and long gun sizes) are recommended. Plastic packaging is not recommended for firearms or bloody/wet objects.

Select a package strong and large enough to support your evidence. For example, do not place a heavy large frame revolver in a small paper bag.

Please minimize your outer and inner packaging. It is not necessary for each cartridge removed from a magazine be placed in a singular package. It is also not necessary for a magazine to be submitted in a container separate from the pistol.

Specimens collected in the hospital (example: bullets, shot pellets, and other fired components) should be air dried prior to sealing the plastic hospital specimen container.

Do not insert metal (such as a wire tag) into the firearm barrel or action.

Keep the firearm action closed. However, if your agency requires the action to be locked open, use plastic zip tie inserted through the magazine well and the ejection port. This will allow the action to be closed while ensuring the firearm is not loaded.

Agency evidence tags should be attached loosely to the firearm’s trigger guard.

It is not necessary to remove the cartridges loaded in a magazine. Simply remove the magazine from the firearm and secure any loose unfired cartridges from the chamber of the firearm. Visually inspect that the firearm is unloaded.

Clearly list the contents on outer packaging including location of recovery (example: *cartridge case recovered from under the couch*). If using outer and inner packages, label each package with description.

For large or bulky packages (clothing, shotguns etc…) cover the to-be-sealed edges with packaging or fiber tape. Then place a piece of evidence tape over a few selected areas and appropriately initial and date the seal.

When sealing the package, use fiber packing tape or a strong clear packing tape with a seal of tamper resistant evidence tape across the packing tape. Affix Biohazard or Hazardous Material labels on the container if appropriate.

Masking, painters, autoclave and electrical tapes and not considered an acceptable form of tape seal.

Avoid the excessive use of evidence tape. Evidence tape should be used to detect tampering, not as the sole sealing device.

If a firearm is recovered in water, keep it submerged in water. The oxidation process that causes rust occurs when the previously wet metal is exposed to air. The item may be placed in a mop bucket, a Styrofoam cooler or a length of PVC pipe with end caps. It is imperative that the firearm be examined immediately at this point. Call the Firearm Section ahead of your arrival and an examiner will be prepared to aid you with this submittal.
Toolmark Examinations

Toolmark examinations are requested to determine if a toolmark was produced by a particular tool. Commonly submitted tools include bolt cutters, knives, pry bars and screwdrivers. Commonly submitted objects for comparison include chain links, victim’s cartilage, copper pipes and pad locks.

Tools have individual characteristics from the manufacturing process and from use and abuse. These unique marks can be imparted from a hard object (tool) to a softer object leaving a toolmark. These toolmarks may be suitable for comparison purposes and can thereby be identified to, or eliminated, from a particular tool.

To ensure the safe handling, storage and submission of tools, these steps and safety tips should be followed:

- Items such as knives or other tools should be packaged in a puncture proof container such as a cardboard box. It may be necessary to use a minimum number of plastic zip ties to secure the item within the cardboard box. Label the package as containing a sharp object.
- At a minimum, latex, nitrile or other non-porous polymer gloves must be worn when recovering and packaging evidence that is soiled with body fluids. Additional personal protective equipment may be beneficial for personal safety and to avoid contamination of the evidence.
- Tools (e.g. knives) coated or stained with suspected blood should be labeled as “Biohazard”
- All biological material should be treated as a biohazard. Biological material could potentially expose the handler to HIV, Hepatitis B and C, or other pathogens.

Collection

Marking of toolmark evidence prior to laboratory submission should utilize ink, rather than scribing or other marking methods. Additional marks added during the collection process may overwrite the microscopic marks or patterns needed for comparison.

If there is any possibility that your agency will request DNA, latent print processing or trace evidence collection from toolmark evidence, each individual who collects or handles the evidence must wear a clean pair of gloves and minimally handle the affected surfaces of that item. Remember when handling items that are blood stained / soiled, gloves should be changed between every item collected / packaged.
Preservation and packaging

Tools and objects bearing toolmarks must be minimally handled to avoid loss or destruction of evidence.

Do not allow the tool to be placed in contact with or packaged with the object bearing the toolmark.

Please package one tool per package.

If there is potential for trace evidence to be on the tip or cutting surfaces of the tool, such as paint transfer or copper residue on bolt cutter jaws, then these tools should be secured inside a box with a minimum number of plastic zip ties to limit the movement of the item within the box.

Evidence must be clearly labeled as to what is the actual questioned mark or area of interest.

Label and diagram the orientation of the questioned mark. For Example: “from interior door, above door knob”

Items such as knives and other heavy tools should be packaged in a puncture proof container such as a cardboard box. It is highly recommended that they are secured within the box using plastic zip ties.

Label the package as containing a sharp object and indicate the direction the blade is pointing.

Clearly list the contents on outer packaging including location of recovery (example: bolt cutters recovered from toolbox). If using outer and inner packages, label each package with the description.

If it is not possible or practical to submit the evidence toolmark, then a cast of the mark should be submitted. Insert a labeling tag on the back side of the cast for marking purposes. The cast should be completely air dried prior to packaging. Diagrams, labels and crime scene photographs should be submitted with the casts. Packaging should be sufficiently large that the questioned mark is not in contact with the paper or cardboard. Prior to laboratory submission, the cast should be stored in a cool, dry area and not subjected to heat or direct sunlight.

Distance Determinations

The deposition of gunshot residue on evidence such as clothing varies with the distance from the muzzle of the firearm to the target. Patterns of gunshot residue or pellet spread can be duplicated using the questioned firearm and ammunition.

The firearm, the ammunition used, and crime scene photographs are all required for submission in a distance determination case. The target (e.g., victim’s clothing, object that has been shot) are commonly submitted for comparison purposes.

For the detection of Gunshot Primer Residues from a suspected shooter’s hands, refer to the Trace Evidence section of this document.
Collection

Handling of clothing items should be done carefully and at a minimum in order to avoid movement of the gunpowder particles on the garment.

Wet or blood stained clothing should always be air dried flat and at room temperature before packaging.

Marking of these items may be accomplished without affecting the analysis however it is recommended that marks are made in ink and on an area of the garment far removed from the area in question.

It is necessary to conduct distance determination testing on similar materials for comparison. Therefore, if the object is unusual in nature (Example: Upholstery of a car seat), then it will be necessary to perform distance testing on similar material. Collection of standard material may be necessary.

Preservation and packaging

Clothing items to be examined for gun powder residue should always be air dried flat and at room temperature before packaging.

Avoid folding or crumpling the item while packaging. Place a clean piece of white paper over the suspected bullet hole(s). Fold the clothing item in a manner that keeps the bullet hole(s) flat. All attempts should be made to keep the gun powder pattern flat. Flat boxes, such as an unused pizza box, should be used when possible.

Package the remaining air dried clothing items separately in paper packaging. The contents that are not to be examined may then be packaged in one box and labeled.

Emergency personnel cuts should be diagramed or described on the package. Do not attempt to reassemble the item using tape, staples or by any other means.

Clearly list the contents on outer packaging including location of recovery (example: John Doe’s shirt recovered from emergency room floor). If using outer and inner packages, label each package with the description.

NIBIN

The TCME Firearm Section does not make entries into the NIBIN Database.

NIBIN is a national database of digital images of cartridge cases (predominately) and bullets (rarely). Images are acquired, stored and compared to other images stored in the database within a predetermined region of the state/country. The purpose of the system is to link otherwise unrelated firearm offenses.

NIBIN does not eliminate the need for a forensic evaluation or examination of the evidence.
Firearms submitted for examination will be test fired (if possible). Those test fired exemplars will be returned to the submitting agency, packaged with the firearm and listed on the Chain of Custody as a sub-item of the firearm. Test fired exemplars created during the TCME examination process may be subsequently submitted to an agency in the region that utilizes the NIBIN database system.

A NIBIN “Hit” occurs when cartridge case images from two separate incidents or crimes are associated. When a prospective association is made by a NIBIN technician or firearm examiner, the physical evidence must be submitted for comparison in order to confirm or eliminate the association.

The microscopic comparison work is typically performed by the laboratory that worked the linked case with the highest criminal charge. For example: Lab A performs function test on pistol and Lab B has cartridge cases from a Homicide scene. Lab B will perform verification work regarding the NIBIN association.

**Other Examinations**

Serial number restoration: Obliterated and/or altered serial numbers can sometimes be restored. Even partial information such as characters or numbers may be critical information when investigating original ownership of a firearm.

Fracture match / Physical fit: Two or more objects may be examined either through physical, optical, or microscopic means, to determine whether or not those objects were formerly a single unit.

**Collection**

All collection considerations listed in the previous firearm and toolmark sections of this document should be followed.

**Preservation and packaging**

Serial number restoration on firearms: Submitting agencies should not attempt to alter the serial number or disassemble the firearm.

Fracture match / Physical fit: If submitting items from two different locations, they must be packaged separately. (For example: A sawed off shotgun is recovered at the crime scene and a search warrant reveals a sawed off piece of steel, resembling a shotgun barrel, in the suspect’s workshop.)

If submitting items from the same location, care should be taken in packaging the items to avoid loss, damage or destruction of evidence. (For example: Broken pieces of a pool cue stick are recovered in the bar beside the victim.)
LATENT PRINTS

Fingerprints are the most commonly known form of personal identification. The term "fingerprint" is a generic term used to describe friction ridge skin, which is found on the fingers, the palms of the hands, and on the soles of the feet. Examination of this friction ridge skin, and their minute individualizing ridge characteristics, is performed daily by the Latent Print Laboratory of the Tarrant County Medical Examiner’s Office to assist law enforcement agencies in the identification of subjects in criminal cases.

Scope of Services

The Latent Print Laboratory provides the following services:

- Examination of evidence submitted by law enforcement agencies.
- Examination of human remains for the presence of latent prints and patent prints.
- Physical, chemical, and forensic light source examination of evidence and of human remains to develop latent prints.
- Analysis of latent prints and comparison with known fingerprint records.
- Search of latent prints against fingerprint databases using the Automated Fingerprint Identification System (A.F.I.S.).

Collection

Latent prints may be destroyed by excessive handling or by improper packaging of the evidence. Special precautions and care must be taken in order to maximize the evidentiary value of latent prints. If the submitting agency has knowledge regarding any unusual conditions to which the evidentiary item has been exposed it should be provided to the laboratory. Additional information may be helpful, if known, including the handling of the item or special substrate conditions.

If an evidentiary item is submitted for latent print development procedures, the latent print examiner will determine the suitable processing techniques, processing sequence, and preservation methods needed to maximize the evidentiary value. A visual examination for existing friction ridge impressions will be conducted prior to any latent print development procedures.

The TCME Latent Print Laboratory will only use approved development processes, which may include visual analysis, fluorescence examination, physical processing, and chemical processing, depending on the types of substrates encountered. These substrates include porous, non-porous, and adhesive surfaces, and those items contaminated with biological or chemical substances.

If an evidentiary item is processed by the requesting agency, or their agents, prior to its submission to the Latent Print Laboratory, information regarding those processing techniques should be indicated on the submission form. This will assist the Latent Print Laboratory in the analysis of the submitted items.
All latent prints that are determined to be “of value” by the Latent Print Laboratory will be documented and preserved by tape lifts, digital photography, or digital scanning. The TCME Latent Print Laboratory defines a latent print “of value” as having sufficient clarity and sufficient friction ridge details for a conclusion to be reached. Conclusions that may be reached and reported for suitable latent prints include:

- Identification
- Exclusion (Not Identified)
- Inconclusive.

Preserved suitable latent prints may be compared to submitted known exemplars or those on file that are located by the Latent Print Laboratory staff. Comparisons will be limited to those requested by the submitting agency. The agency may be contacted by the Latent Print Laboratory to discuss additional exemplars needed or additional services, such as an A.F.I.S. search.

**Safety Considerations**

Anytime a crime scene is searched, or a potential evidentiary item is handled, Universal Precautions should be followed to ensure the safety of the individual from exposure to possible blood borne pathogens or hazardous chemicals. The proper use of protective gloves and eye protection may greatly decrease the risk of an accidental exposure to these substances. Special care should be given to the proper packaging of any evidence that is contaminated. Biohazard labels should be used and prominently displayed on the exterior packaging.

Bladed items such as knives, razor blades, broken glass, and syringes should be handled with special care and packaged to prevent accidental injury or exposure to sharp edges.

Any firearm that is submitted should be cleared and rendered “safe” prior to submission. If a firearm cannot be rendered “safe” the Latent Print Laboratory should be consulted prior to the submission of the evidentiary item in question.

Any evidence that is submitted for latent print development should be handled in such a way that it will prevent the accidental destruction of any latent prints. Protective gloves should be worn and the item should be handled by any textured areas as much as possible.

**Latent Prints Lifted with Powders**

In many cases, an item that is large or permanently fixed may be dusted with latent print powder and any developed latent prints lifted, and affixed to a latent lift card. These latent lifts may be submitted to the Latent Print Laboratory for examination.

Whenever possible, only one (1) tape lift of developed latent prints should be affixed to each latent lift card. An arrow should be drawn on the front of the lift card to indicate the upward orientation of the latent lift (see Figure 1):
The correct and accurate documentation of the latent print lift is crucial to the analysis process. Information on the back of the latent lift card should include the following:

- Agency Case Number
- Date
- Name, initials, or badge number of individual making the lift
- Location from which lift was collected
- Diagram of the object the lift was taken from, showing an “x” at the location of the lift (see Figure 2)

![Figure 1](image1)

![Figure 2](image2)
Whenever possible, the individual collecting the latent lift should try to avoid leaving their own fingerprint impressions on the underside (adhesive side) of the tape. If this occurs, the individual should place their initials over their own fingerprint impression:

![Figure 3](image)

**Collecting Known Friction Ridge Exemplars**

Clearly recorded and fully rolled inked finger and palm impression exemplars should be submitted as evidence (with proper chain of custody) for comparison with any latent print evidence if they are available. If the finger and palm impression exemplars are not available, the investigator should provide the name, race, sex, and date of birth of the suspect and/or victim to assist in the location of records. Additional information such as driver’s license numbers, identification numbers, and social security numbers may be of assistance. In addition, the Texas State Identification number (SID #) of the subject should be provided if it is known.

**Fingerprints / 10-Print Cards**

A properly inked and rolled 10-print card should have all ten fingers rolled, nail-to-nail and with the pattern area represented. Simultaneous impressions should be recorded at a 45-degree angle at the bottom of the card (see Figure 4):
Documentation that should be present on the fingerprint exemplars includes:

- Name of person printed
- Race, Sex, and Date of Birth
- Signature of person printed
- Signature or initials of person collecting the prints
- Date subject was printed

Palm Prints

Palm prints may be submitted as evidence on a Palm Print Card or on a blank sheet of paper. These impressions should be completely rolled, from the wrist crease to the tip of fingers. Additional impressions of the thenar area (the thumb side) and the hypothenar area (also known as the writer’s palm) should be present (see Figure 5):
Figure 5

Documentation that should be present on the palm print exemplars includes:

- Name of person printed
- Race, Sex, and Date of Birth
- Signature of person printed
- Signature or initials of person collecting the prints
- Date subject was printed
Major Case Prints

Each finger should be recorded with all of the friction ridge details from the fingertip to the base of the finger. A total of five (5) impressions should be recorded:

- Left side at 45 degrees
- Centerline of the finger
- Right side at 45 degrees
- Entire finger rolled from nail-to-nail
- Tip of the finger (see Figure 6):

![Figure 6]

Special care must be taken to document which hand and finger is represented in each impression. Appropriate markings may include Right Hand or Left Hand, and marking each set of impressions to identify the finger recorded (see Figure 7):

![Figure 7]
Documentation that should be present on the major case print exemplars includes:

- Name of person printed
- Race, Sex, and Date of Birth
- Signature of person printed
- Signature or initials of person collecting the prints
- Date subject was printed

**Packaging**

Evidentiary items that are non-porous (i.e., guns, knives, bottles, etc.) should be packaged separately, and secured to prevent excessive movement that may destroy any latent prints through abrasion. Whenever possible, these items should not be packed in plastic bags as they may adhere to the surface of the item and damage any potential latent prints present.

Evidentiary items that are porous (i.e., cardboard, paper, cloth) may be packaged together if necessary.

Any items that are wet must be dried thoroughly prior to packaging to avoid mildew, damage to the packaging material, or contamination from “leak-thru”.

If analysis is requested by multiple laboratories (i.e., Latent Prints, DNA, Firearms, Drug Chemistry) it should be clearly marked on the submission form and communicated to the Evidence Department at the time of the submission. In many cases each laboratory included in the request will be consulted to determine the proper sequence of testing or analysis.

Bladed items such as knives, razor blades, broken glass, and syringes should be packaged in appropriate containers and boxes to prevent accidental injury or exposure to sharp edges.

Any evidentiary item that is known or suspected to have been contaminated by biological or chemical substances must be labeled appropriately with biohazard labels.

If an evidentiary item contains liquids that are to be tested, the liquid should be transferred to another container prior to submitting it to the Latent Print Laboratory for analysis. If this is not possible, the item should be sealed to prevent leakage or contamination. Proper documentation of the types of chemicals removed or present must be included with the submission.

Evidence marking is a standard procedure and care should be taken to place any markings so that potential latent prints are not damaged.

Known fingerprint and palm print exemplars may be packaged together in flat envelopes. Care should be taken to ensure that any ink has completely dried prior to packaging.
Ideally, evidence should not be subjected to latent print development processing prior to submittal to the latent print laboratory for processing. Evidence that has been subjected to any latent print development processes, whether chemical or physical, should be documented and provided to the Latent Print Laboratory at the time of submission. The types of development processes must be clearly communicated so that appropriate measures can be taken to maximize the efforts of the laboratory.

Digital Images

It is not uncommon for customers to submit photos of friction ridge impressions. Digital images of friction ridge impressions that are submitted to the Latent Print Laboratory should be submitted on CD-R or DVD-R discs. These should be packaged like any other type of evidence and chain-of-custody must be maintained.

Historically, photographers have been trained to “fill-the-frame” as much as possible with the latent print, being sure to include a scale for reference. With the advent of modern, high-resolution, digital cameras it is acceptable to fill less of the frame when needed as long as the scale is present. Overall, a good quality, well focused image should be taken parallel to the surface on which the print is located. Some guidelines for latent print photography include:

- Any friction ridge impression that is to be used for comparison or identification should be captured in the highest resolution, “lossless” format available (i.e. RAW or TIFF). This means a minimum of 1000ppi (pixels per inch), or higher, resolution when the image is sized 1:1, or by using existing film photographic techniques.
- Grayscale digital imaging (photographs or scans) should be at minimum of 8 bits.
- Color digital imaging (photographs or scans) should be at minimum of 24 bits.

Disposition

All evidentiary items that are received for analysis will be returned to the submitting agency upon completion. This includes any latent print lifts that are collected by the Latent Print Laboratory.

Any latent prints that are only retained via photographs, will be treated as “non-recoverable” evidence.

If known exemplars are obtained by the Latent Print Laboratory they will be released to the submitting agency at the completion of the analysis.

Any latent prints that are found to be of “no value” for identification are also considered to be of “no value” for an A.F.I.S. search. Under these conditions an A.F.I.S. search will not be conducted with the impressions, even if it is requested by the submitting agency.

In the event that known fingerprint exemplars are needed for comparison it may be noted in the report issued by the Latent Print Laboratory.
TRACE EVIDENCE

The Tarrant County Medical Examiner’s (TCME) Office Trace Evidence staff is committed to providing quality Trace Evidence services to customers. The Trace Evidence staff will ensure the quality of laboratory results through the use of established and approved methods and procedures. The quality system will ensure that Trace Evidence staff performs functions as intended in accordance with exemplary laboratory practices.

Scope of Services

The TCME Trace Evidence laboratory performs primer gunshot residue (GSR) analysis as well as the collection and processing of evidence from deceased bodies, vehicles, and other types of evidence. Due to the diverse nature of trace evidence and because trace evidence can be readily lost or contaminated by exposure, this laboratory encourages customers to contact a Trace Evidence Examiner to discuss the most effective evidence collection and handling procedures to maintain the integrity of the evidence and to ensure that probative information can be provided as a result of any examinations.

Safety Considerations

Trace evidence is often associated with biological fluids and biohazard materials. Universal Bloodborne Pathogen Precautions must always be observed when applicable. Razor blades, scalpels, knives and broken glass may be encountered in Trace evidence collection. Personal protective equipment such as eye protection, lab coat, and non-porous polymer gloves is recommended when contacting such materials. Firearms are also encountered in trace evidence casework and gun safety must always be applied.

Primer Gunshot Residue (GSR)

Primer Gunshot Residue is composed of antimony, barium and lead, which are components of most primer mixtures. This residue may be deposited on a shooter’s hands, depending on the type, caliber, and condition of the weapon used and the environmental conditions at the time of the shooting.

This type of analysis is done on samples typically obtained from the hands of persons suspected of recently discharging a firearm. The analysis is conducted by SEM-EDS (Scanning Electron Microscopy-Energy Dispersive Spectrometry) which allows for the identification of GSR particles based on morphology and composition.

Gunshot primer residue analysis does not give an indication of the distance from which a firearm is fired (i.e., Distance Determination). Refer to the Firearms and Toolmarks Evidence Collection section for the information and evidence required to determine an approximate distance between clothing and a fired weapon.

Analysis for gunshot primer residue is performed on SEM stubs only. Atomic Absorption (AA) Kits will be returned without analysis. Referrals to the remaining labs in the United States that perform AA analyses will be provided upon request. Instant Shooter Identification (ISId) Kits that do not include SEM stubs will also be returned without analysis.
GSR Evidence Collection and Submission

Submission of case information on a GSR Kit Information Sheet is encouraged. At a minimum, please include the subject’s name, the date and time of the incident, and the date and time of collection.

The most important factor in the number of primer GSR particles identified is the activity of the subject between the time of the shooting and the time of collection. Studies have shown that normal activity can remove all GSR particles from a shooter’s hands within 4-6 hours. Hand washing can remove all particles immediately. Collect GSR samples as soon as possible after a shooting incident. If immediate collection is not possible, protect the hands with paper bags until collection is possible.

While TCME does not have a limit on the time between the shooting incident and time of collection, the probability of identifying GSR particles decreases with time in an active individual.

TCME will analyze GSR kits collected from victims. It is important to understand that primer GSR particles can travel 5 or more feet from the firearm and therefore many shooting victims will have GSR particles on their hands. The presence or absence of GSR particles cannot prove or disprove suicide.

Clothing from shooting suspects can be submitted to the laboratory for gunshot primer residue analysis if required. In these cases, an explanation of the scenario is often helpful. In these instances, the entire surface of the clothing is not sampled. Clothing will be sampled in areas where the presence of gunshot primer residue would yield a stronger indication of the individual having fired (front of shirt, cuffs of long sleeved shirts) or carried a weapon (inside pockets and/or waistband), and will be at the discretion of the trace examiner.

If necessary, client agencies may choose to sample the clothing the suspect is wearing at the same time that a GSR kit is collected from the suspect’s hands. If this is done, the GSR stubs must be clearly labeled as to the location on the clothing from which the samples originated.

GSR stubs may also be collected from vehicles if it is suspected that a firearm was discharged inside the vehicle. Horizontal surfaces like the dash, console, and window frames are good candidates for collecting GSR as well as the headliner. Please contact one of the Trace Evidence Examiners for specific information about collection of GSR stubs from vehicles.

Results and Interpretation

If you have any questions about whether analysis of a GSR kit will add information to your case or questions about interpretation of results provided in a report, please contact the Trace Evidence laboratory.
Collection and Processing Of Evidence from Decedents

Upon request of the assigned forensic pathologist or the investigating agency, trace evidence recovery personnel will examine decedents in the morgue for evidentiary materials that may be present. These examinations may include:

- head-to-toe visual examination for trace materials
- collection of
  - gunshot residue kits
  - fingernail clippings
  - swabs for DNA from contact areas
  - known standards of hair
  - any other relevant trace materials present on the decedent

When requesting this service:

- All contact with the decedent prior to delivery to this office must be of a very limited nature
- Hands of the decedent must be bagged.
- The decedent must be wrapped in a clean white sheet and secured in a sealed body bag

It is NOT necessary to request the response of the Trace Evidence recovery team when the only requested evidence collections involve a sexual assault kit, a GSR kit, or fingernail clippings. Although these requests should be made known to TCME Medical Investigators for communication to morgue staff, these evidentiary samples are routinely collected by morgue staff as appropriate, and the Trace Evidence recovery team will not be required.

Collection and Processing Of Evidence from Vehicles

Upon request, laboratory personnel will examine vehicles for evidentiary materials pertinent to the case in question (homicide/kidnapping/sexual assault in a vehicle, vehicular hit and run, etc.). This may include but is not limited to a

- Complete visual examination for trace materials (hairs, fibers, foreign paints, plastics, impressions, etc.)
- collection of :
  - gunshot residue samples
  - known standards (paints, metals, plastics, etc.),
  - stains (possible blood, semen, saliva, etc., in consultation with Serology personnel)
  - collection of any other relevant trace materials present
Trace materials recovered will be retained by the trace evidence laboratory, packaged, and entered into the TCME evidence system in preparation for release to the customer. Standard procedures regarding photography, collection and preservation of evidence, and packaging will be followed.

Please contact the Trace Evidence laboratory before bringing a vehicle for examination, to ensure that all required personnel are available. When requesting this service:

- All contact with the vehicle prior to delivery to this office must be of a very limited nature.
- The vehicle must be submitted with a chain of custody
- The vehicle should be placed on a flatbed truck or trailer for transportation to the TCME Crime Laboratory Vehicle Processing Bay.
- Any areas of apparent damage should be covered with a new tarpaulin, plastic, paper or other non-contaminating material to prevent loss of trace materials during transport.
- Arrangements must be made to retrieve the vehicle as soon as the Trace Evidence recovery team has processed the vehicle.
TOXICOLOGY

Scope of Services

The Forensic Toxicology laboratory analyzes biological samples for the presence and quantity of alcohol, other volatiles, carbon monoxide, and many over-the-counter, prescription, or illicit drugs. Blood and urine are the sample types most commonly analyzed. The laboratory analyzes biological samples to aid the Medical Examiner in determination of cause and manner of death, and to aid law enforcement in the investigation of traffic offenses, drug facilitated sexual assaults, or other criminal matters.

Alcohol and Drug Analysis of a Biological Sample

Submit sample(s) with requests for alcohol and/or drug analysis to the TCME. Drug analysis can also be requested conditionally if the alcohol concentration is determined to be less than, for example, 0.10 grams per 100 milliliters. These conditions should also be noted when submitting the evidence. Since drug analysis incurs a higher fee it will only be performed upon request of the submitter unless the case originated from a non-traffic offense (i.e., death investigation or drug facilitated sexual assault). Keep the sample refrigerated or submit as soon as possible. Refrigeration retards the degradation of some drugs in the sample.

Traffic Offenses

For a traffic-related offense, a blood sample is preferred over a urine sample. Submit a full gray top tube of blood if possible; two tubes are preferable. If only urine is submitted, it should have the support of a DRE evaluation for prosecution. Testimony from urine analysis is limited. Drugs detected in urine show prior usage of drugs and may not correspond to the presence or levels of drugs in the blood at the time of the offense. Drug detection in blood aids in determination of the influence of the drug(s) at the time the sample was taken.

Customers submitting blood evidence to the toxicology laboratory specifically for DWI testing should include a copy of the DIC-23A form completed at the time of the arrest. The DIC-23A form should include information about any medications found at the scene or admitted to by the arrestee.

Death Investigations

In death investigations, the Toxicology Section normally performs analysis of blood, vitreous, and/or urine specimens.

- **Blood** can be analyzed to determine intoxication deaths or contributing factors for other causes of death.
- **Vitreous** is analyzed primarily to support the blood alcohol level or analyzed when the blood is contaminated.
- **Urine** is analyzed primarily to support the drug detection in blood, or to evaluate the time of drug usage relative to time of death.

Other specimens collected at the autopsy should be frozen and stored for submission at a later date if a need develops for a particular specimen. These could be important in cases involving special situations.
Sexual Assault Investigations

The TCME Toxicology Section normally performs analysis of blood and/or urine specimens in the investigation of a sexual assault. It is recommended that both samples be submitted. Urine provides the longest window of detection for drug facilitated sexual assaults. The sooner a specimen is collected the greater the chance of detecting drugs which may have been used. Most drugs are detectable in blood within 12 hours; however some may be quickly eliminated. Most drugs are detectable in urine within 72 hours. Alcohol and drug analysis is recommended in sexual assault investigations where victims report impairment or unconsciousness.

- **Blood** - Collect blood in 10 mL gray-top vacutainer tubes containing a preservative and an anticoagulant. The sample should be refrigerated until transported to the laboratory.

- **Urine** - If the specimen is collected in a urine collection cup, transfer to a leak proof bottle.

Detection of Drugs and Drug Metabolites

The Toxicology Laboratory performs a general unknown screening (GUS) procedure to detect the presence of drugs in a sample. This GUS procedure is complimented by an immunoassay screening technique that does not identify any specific drug, but rather classes of drugs. Screening is followed by confirmation and quantitation to confirm the specific drugs present and determine the amount of each compound within the sample. The concentration can be compared to literature values to support impairment cases or evaluate the contribution of a drug in a death case. Cases which fall below screen cut-off levels are reported as “no drug detected” unless additional information is provided to indicate significant impairment or the involvement of a drug not detectable by the immunoassay screen. All drugs reported undergo identification by GC/MS (Gas Chromatography-Mass Spectrometry), LC/UV (Liquid Chromatography-Ultraviolet detection) and/or LC/MS (Liquid Chromatography-Mass Spectrometry). For information concerning specific detection capabilities or cutoff values, please contact the laboratory.

The following drugs are NOT routinely reported from the laboratory:

- Antibiotics
- Heart medications
- Diabetic medications
- Diuretics
- Lithium or other metals
- Mescaline
- Psilocybin
- LSD
- Synthetic Cannabinoids (K2, spice)

Other compounds can be readily quantified but are more difficult to detect during the screening process. Buprenorphine, zopiclone, zaleplon and risperidone fall into this category. If one of these compounds is suspected that information should be included with the submission form; alternately, all suspected medications may be listed.
Safety Considerations

Toxicological evidence is always considered a biohazard and Universal Precautions should be observed. Treat all biological samples as if they are infected with a bloodborne pathogen. Personal protective equipment (such as eye protection and gloves) is recommended. Assure that the package containing the biological specimens complies with all postal regulations for shipping biological specimens including protective containers, absorbent material, and biohazard warning labels. Additional information regarding packaging and air shipment requirements of a biological sample can be acquired from IATA (International Air Transportation Association).

DRUG CHEMISTRY

Scope of Services

The Drug Chemistry section evaluates physical evidence for the presence of controlled substances and other compounds. The evidence submitted may be plant material, powders, liquids, syringes, pills, or tablets. The laboratory typically determines both the identity of the compounds and the net weight (weight without packaging) of the submitted evidence. The Drug Chemistry section does NOT perform quantitative analysis of drug evidence (purity determinations).

Safety Considerations

Syringes, razors, and broken glass pose safety hazards to personnel collecting or handling drug evidence, especially if the evidence is contaminated with biological material. In addition, some drugs or chemicals can be absorbed through the skin or mucous membranes and pose a hazard to handlers. Personal protective equipment including gloves, a lab coat or covering, and eye protection is recommended when handling evidence of this type.

Packaging

1. Submit drug evidence in an appropriately sized container.

2. The actual physical evidence may require additional packaging before placing it in the outer container. Inner packaging may include zippered bags, heat-sealed bags, plastic sample bottles, or other containers appropriate for the evidence being submitted. Example: Place suspected small crack rocks in a zippered bag and seal in an envelope for submission.

3. Place exhibit number, initials, date, and seal on inner packaging. Always follow your department’s procedures for marking and packaging evidence.
4. After the physical evidence is carefully placed in an outer container, it is ready for sealing. The TCME requires a proper seal to be placed on the outer container of ALL evidence in the care, custody, and control of the laboratories. An appropriate guideline to follow is to place a seal on all points of entry of the container, such as both ends of an envelope or the top and bottom of a box; further entrance into the container must be evident. Use tamper-evident tape, such as evidence tape or clear 2” packing tape. A proper seal means your seals must contain tape, date, and initials on all seals made. Seals do not necessarily have to be created over intact manufactured seals.

**Marihuana and Other Plant Substances**

**Collection**

1. Fresh green plant substance (marihuana, mushrooms, cactus, etc.) shall be dried thoroughly before being submitted if possible.

2. Do not include the roots and dirt with the plant substance.

3. Leaves and stems shall be stripped from large stalks for submission. Large stalks, dirt, or roots are not included in the weight. Large drug seizures may have been soaked in gasoline. Contact the laboratory before bringing the evidence to the laboratory facility to discuss the venting of gasoline or other noxious fumes.

**Special Packaging Requirements**

1. Package freshly dried plant substance in paper bags or boxes to allow for continued drying before submission.

2. Large drug seizure evidence should be sub-divided in containers weighing no more than thirty (30) pounds. Individual bundles weighing more than thirty pounds do not have to be subdivided.

**Biohazard Evidence**

**Collection**

Syringes will not normally be examined by the TCME laboratories. Only the prosecuting attorney may request the examination of syringes or the presumed content of a syringe.

1. Leave any liquid contents in the syringe. Do not attempt to transfer the contents of the syringe to another container.

2. Liquids from a syringe will be treated the same as a syringe. It will not be examined unless requested by the prosecuting attorney.

3. If you believe you have retrieved the contents of a syringe already in another container, consider it to be a biohazard and treat it with the same precautions. Drug evidence or a container with drug evidence is often confiscated from a body cavity or spit from the mouth. This drug evidence is considered a biohazard and will be treated as such.
Clandestine Laboratory Chemicals

Safety Considerations

The greatest safety hazard associated with clandestine laboratories is chemical exposure. The chemicals can cause severe chemical burns and/or may be toxic. The use of personal protective equipment such as eye protection, protective clothing, self-contained breathing apparatus (SCBA) or air purifying respirators, and nitrile gloves is recommended.

Collection

1. Package all liquids in a sturdy plastic bottle with secure plastic lids or a glass jar with a plastic lid. Lids may be sealed with chemical tape or duct tape. Do not use metal lids on jars or bottles.

2. Label bottles clearly. Exhibit numbers are the minimum that should be on each piece of evidence. Placing a piece of 2-inch packing tape on the bottle, writing the information on the bottle, and placing a second piece of tape over the writing is frequently effective in preventing organic solvent fumes from dissolving the writing. Evidence bags with white “write on” strips seem to resist ink loss well.

3. Place individual exhibits in separate sealed plastic zipper bags. Again, placing a piece of 2-inch packing tape over the mouth of the plastic zipper bag, writing the information on the tape seal, and placing a second piece of tape over the writing is frequently effective in preventing organic solvent fumes from dissolving the writing. Prop bottles upright to reduce the chance of spillage.

4. Place solids in sturdy plastic bottles and handle as described in #1, 2, and 3. Solids can also be submitted in a plastic zipper bag, sealed as described in #3. Placing the plastic zipper bag inside another, which is also sealed as described in #3, will protect the solid from contamination resulting from any spills or vapors.