



UNODC

United Nations Office on Drugs and Crime



Crime scene and physical evidence awareness for non-forensic personnel

Laboratory and Scientific Section
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Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as silent evidence against him. Not only his fingerprints or his footprints, but his hair, the fibers from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects - all these and more bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong; it cannot perjure itself; it cannot be wholly absent. Only its interpretation can err. Only human failure to find it, study and understand it, can diminish its value.

Kirk, Paul,
Crime investigation,
John Wiley & Sons Canada, Limited, 1953

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A magnifying glass is positioned over a diagram of a crime scene, which includes a path and various markers. The background is a solid blue color.

Introduction and purpose

Every incident, be it a crime, accident, natural disaster, armed conflict, or other, leaves traces at the scene. The goal of the subsequent investigation is to correctly interpret the facts, reconstruct the events and understand what happened.

Due to the transient and fragile nature of those traces, their reliability and the preservation of their physical integrity depend to a very large extent on initial actions at the scene of the incident. Evidence integrity can be achieved with very limited means by observing a key set of guiding principles. Acting with care and professionalism throughout the crime scene investigation process is critical for the admissibility of evidence for court purposes as well as for human rights inquiries and humanitarian action.

The present manual was prepared to fill a gap in the compendium of available tools for the judiciary and law enforcement agencies and is the result of a consultative process involving a number of reputable individuals, institutions and organizations, who contributed a variety of different perspectives to this cross-cutting issue, all grounded in the same basic principles common to all crime scenes.

For the sake of simplicity, the term “crime scene” is used in this manual to refer to any scene of incident that contains records of past activities.

The manual aims at raising awareness of the importance of good practices in crime scene investigations and the nature and relevance of physical evidence. It covers issues related to the work at the scene, from the actions of the first responder(s) to the submission of evidence to the laboratory. As such, it provides the very basis for enabling more evidence-based reconstruction of events.

The primary target audience of the manual is non-forensic personnel, i.e. first responders and any person involved in the crime scene investigation process without full-fledged training, to help them understand the importance of their actions and the consequences of not applying basic principles of good practice. The manual also targets policymakers, the judiciary and others having to assess, and/or base decisions on evidence presented to them.

As an awareness-raising tool for non-forensic personnel, the manual provides a basic outline of the crime scene investigation process with a focus on why individual steps and actions are essential. An Annex provides examples of physical evidence that can be recovered from crime scenes, the information that can be obtained from subsequent forensic examinations, and sample cases where different types of physical evidence might be encountered.

It is important to note that the manual is not a guide for crime scene investigations, neither for first responders nor for crime scene investigators. Detailed checklists and guidelines for preserving, documenting and processing crime scenes are available elsewhere and should be consulted where practical, hands-on guidance for work at the crime scene is required. Those guidelines are typically used in combination with training courses. Further advice should always be sought from local competent authorities and forensic scientists.



PART I

The value of physical evidence and the concept of chain-of-custody

Physical evidence can be anything from massive objects to microscopic items, generated as part of a crime and recovered at the scene or at related locations.

Considering all sources of information available in investigations (e.g. confessions, testimonies, video surveillance), physical evidence plays a pivotal and an especially valuable role. With the exception of physical evidence, all other sources of information suffer from problems of limited reliability. Physical evidence, when it is recognized and properly handled, offers the best prospect for providing objective and reliable information about the incident under investigation.

However, the value of even the most carefully recovered and preserved evidence can be lost if the chain-of-custody is not properly maintained. “Chain-of-custody” is often recognized as the weak link in criminal investigations. It refers to the chronological and careful documentation of evidence to establish its connection to an alleged crime. From the beginning to the end of the forensic process, it is crucial to be able to demonstrate every single step undertaken to ensure “traceability” and “continuity” of the evidence from the crime scene to the courtroom.

Forensic science services and the crime scene investigation process

The role of forensic science services starts at the crime scene with the recognition and recovery of physical evidence. It proceeds with its analysis and the evaluation of the results in a laboratory, and the presentation of the findings to judges, prosecutors, lawyers and others in need of the factual information. From the first responders to the end-users of the information, all personnel involved should have an adequate understanding of the forensic process, the scientific disciplines and the specialized services provided by forensic laboratories.

Crime scene investigation is a process that aims at recording the scene as it is first encountered and recognizing and collecting all physical evidence potentially relevant to the solution of the case.

The first responder(s), be they law enforcement officers, human rights officers or anyone else, play a critical role in the entire crime scene investigation process. Their initial responsibilities are to preserve the integrity of the scene and the evidence. Furthermore, they are responsible for the early documentation of the crime scene, its evidence and all activities at the scene. As in the majority of cases first responders are non-forensic personnel, adequate training to carry out these tasks is critical.

Under ideal circumstances, crime scene investigators who have received full-fledged forensic training quickly take over the work at the scene. However, there are situations that may require first responders (who are normally not expected to further process the scene) to carry out some basic recovery procedures before the arrival of the crime scene investigators, if there is a risk of the evidence being destroyed, lost or contaminated.

In situations where there is no prospect for the crime scene to be processed by crime scene investigators, the responsibilities of the first responder might have to be extended beyond preservation and documentation activities. These situations typically occur if the crime scene is in a remote location, if skilled crime scene investigators are not easily available, or if the criminal justice system response is not adequate.

Legal, ethical and human dignity considerations

Legal

While there are general principles related to crime scene investigations, local laws, rules and regulations govern many activities of the crime scene investigation and forensic process. They relate to issues such as how to obtain authority to enter the scene, to conduct the investigation, to handle evidence (e.g. the type of sealing procedure required) and to submit physical evidence to the forensic laboratory. They ultimately determine the admissibility of the evidence collected at the crime scene.

Failure to comply with existing laws, rules and regulations can result in a situation where the evidence cannot be used in court. It is therefore of importance for personnel working at the scene to be aware of, and ensure proper compliance with, these rules.

If adequate laws, regulations and rules to enable the forensic process do not exist, their establishment may be a matter of necessity.

Ethics and human dignity

Regardless of the local laws, rules and regulations, codes of professional conduct outline ethical obligations of personnel working at crime scenes. Such codes typically stress the importance of acting with care and professionalism (due diligence), objectivity (“treat evidence for what it shows not what you think it shows”), open-mindedness and impartiality (“you may not be independent from the police but you are impartial”).

If there is a conflict between preservation of evidence and the possibility of saving a human life, priority is always given to emergency medical care.

Codes of conduct also address the need to respect individuals and their human dignity when examining and collecting physical evidence from dead bodies or the living, and for the victims' privacy. This includes the control and management of the media.

Health and safety considerations

Personnel working at crime scenes may be exposed to various health and safety hazards. Not all hazards are immediately obvious and some may come up as the investigation unfolds.

Potential hazards may arise from a number of sources:

- Chemicals (either those present at the scene, for instance, in the case of clandestine laboratories, or chemicals used as part of the investigation);
- Biological materials (e.g. blood and body fluids may present a risk of HIV/AIDS and other infections);
- Unexploded explosives (e.g. booby traps);
- Firearms;
- Environmental factors (e.g. excessive heat or cold);
- Unsafe structures (especially when collecting evidence at fire and bombing scenes);
- Insecure environment (e.g. offender still present at the scene);
- Other risks: sharp objects, radiological, nuclear and electrical risks, gases, etc.

Health and safety procedures are the most important issues to be considered when arriving at crime scenes and should remain a priority throughout the process. It might be necessary to suppress or remove health and safety hazards before starting the investigation. These procedures include the provision of first aid kits, appropriate protective clothing (e.g. helmet, gloves), adequate equipment but also necessary interventions of the fire brigade, and/or counselling after the investigation as crime scenes can be emotionally difficult situations.

Beyond the hazards encountered at the scene itself, laboratory personnel may be exposed to hazards when receiving items collected at the scene. The personnel working at the scene play an important role in minimizing hazards to others handling collected evidence later in the forensic process (e.g. by using appropriate packaging and warning labels).



PART II

Planning, organization and coordination of the work at the scene

- ❖ The planning, organization and coordination of the work at the scene aims at deploying resources commensurate to the case being investigated and using these resources efficiently and effectively.

Good planning is essential to the work at the scene. It includes gathering the maximum of readily available information by considering questions such as: What is believed to have taken place? What is the magnitude of the problem? Is any specialized expertise/medical assistance required? Are there any particular dangers at the scene? What other assistance might be required? Is the scene an indoor/outdoor scene? Is it a remote location? What local resources will be available? Who else needs to be informed? What equipment is required? What are the weather conditions? Other important aspects of the planning are: considering the nature of the incident, the context of the case, planning the expertise and equipment likely to be required, managing delays in attending the scene by ensuring its proper protection until the personnel and equipment arrive.

At the crime scene, the organization and coordination of the work is based on an initial scene evaluation. This takes place before the actual forensic work at the scene. Organization and coordination continue throughout the investigation and include what needs to be done (i.e. the sequence of actions, priorities), who is allowed to enter the scene (i.e. the access is limited to personnel playing an essential role in the crime scene investigation and in the medical care of victims present at the scene), who is responsible for which tasks (e.g. designation of a leader, definition of roles and responsibilities, assignment of tasks and need for specialized expertise) and how required actions will be undertaken (e.g. applicable procedures, need for specialized equipment and tools and required communication channels).

Because each crime scene is in some way unique, planning and organization require adaptation and flexibility from one case to another. In addition, during the course of an investigation, the requirements may change as new elements are recognized and the personnel working at the scene may have to adapt the organization of the work accordingly.

The equipment required for crime scene work is typically available to the personnel working at the scene, readily put together in a box/kit and replenished regularly, to enable rapid response. Some cases may also require specialized equipment.

Practical guidance on the equipment for crime scene investigation is provided in the UNODC manual on “Staff Skill Requirements and Equipment Recommendations for Forensic Science Laboratories”.

WHY IS IT IMPORTANT?

- Arriving unprepared at the scene, especially without the commensurate equipment and expertise, may result in missed opportunities and compromise the entire investigation.
- An uncoordinated approach can lead to misunderstanding, to duplication of effort or to wrong assumptions that someone else is taking care of a particular assignment.
- Without clear assignments of responsibility, important elements at the scene may be overlooked, evidence may go unrecognized or worse, may be lost.
- Having too many or inappropriate people involved also runs the risk of compromising or destroying relevant evidence.
- Establishing early communication at the scene and between scene and laboratory personnel creates a better understanding of possible further examinations that could be conducted on physical evidence and significantly improves the outcome of the case.

Preservation of the scene and its evidence

- ❖ Preservation of the scene and its evidence aims at implementing appropriate protective and anti-contamination measures to keep disturbances of the scene and the physical evidence to a minimum.

Scene preservation starts as soon as possible after the incident is discovered and reported to the appropriate authorities. Concerns for scene protection end only at the point where the scene investigation process is completed and the scene is released.

Delineation of the area to be protected is a complex activity and the boundaries of the scene may change as the investigation unfolds. What appears to be obvious at the outset may change and need to be re-evaluated. Once delineated, the area is clearly cordoned off using any kind of physical barrier. Any non-essential people who entered the scene before the cordon was established are removed (and this information is recorded) and any non-essential people are prevented from entering the scene during the entire scene investigation.

From the beginning to the end of the crime scene investigation, strict anti-contamination measures are important. They include: wearing protective clothing, gloves and shoe covers; using a single path when entering the scene (this is also valid for medical personnel providing care to victims); keeping away from using any facilities available at the scene (e.g. toilet, water, towel, telephone), eating, drinking or smoking; avoiding moving anything/anybody, unless it is of absolute necessity (if something or somebody is moved, the initial location should be carefully documented).

When selecting protective and anti-contamination measures, respect for the victim's privacy and human rights are important. If required, the use of screens, curtains, tents should be considered.

If, during the course of the investigation, a second or third, related crime scene is discovered, each scene is treated separately (i.e. separate teams working on the different scenes).

Finally, it should also be recognized that, strictly speaking, unaltered scenes are rarely if ever encountered. Discovery of the event may unavoidably alter the scene. In outdoor scenes, weather may compromise evidence. Further alterations may take place if it is necessary to provide medical aid to a victim or when action to ensure human security is required, such as extinguishing a fire or defusing an explosive device. In those situations, directions and guidance are given to the personnel to minimize disturbance of the scene and its evidence.

WHY IS IT IMPORTANT?

- A scene not properly secured and preserved will lead to unnecessary activity at the scene, which may irreversibly modify, contaminate and compromise the scene and its evidence.
- Lack of protective measures can result in the destruction of important evidence, and thus misdirect investigators and adversely influence the final result of the investigation. In the worst situation it may prevent the solution of the case or result in a wrong conclusion.
- No or unsystematic use of protective clothing by the personnel working at the scene will lead to irrevocable contamination of the scene (e.g. hairs, fingermarks, shoemarks, cigarettes left by the personnel working at the scene). Those contaminations may ultimately prevent the solution of the case.
- No or unsystematic use of protective clothing will also expose personnel to unnecessary health and safety hazards.
- Once the scene is released, opportunities to correct errors or recover unrecognized or overlooked evidence seldom exist.

Documentation of the scene and its evidence

- ❖ Documentation aims at producing a permanent, objective record of the scene, of the physical evidence and of any changes that take place. Documentation at the scene is also the starting point for the chain-of-custody.

Documentation starts with the arrival of the first person at the scene. Using appropriate means (e.g. notes, photography, video, sketches and measurements), the scene as it is first encountered is recorded, including, among other things, arrival time, status of doors, windows and shades, odours, signs of activities. Any person present at, entering or leaving the scene and any changes that take place as a result of activity undertaken or observed are recorded as well. Once physical evidence is recognized, detailed documentation is made before it is moved or recovered. Each recovered item is labelled individually.

The requirement for documentation continues throughout the crime scene investigation process and beyond until the result of the laboratory examination is available. It constitutes the chain-of-custody.

When a person working at the scene leaves the investigation, all information (e.g. photographs, records, notes, etc.) is turned over to the personnel coming in. Briefings also take place at this point in time.

WHY IS IT IMPORTANT?

- Personnel working at the scene may be called upon to recount certain details and demonstrate actions taken during the scene investigation. Memory cannot be relied on for this.
- Documentation is crucial to recall and demonstrate, at a later stage, the initial status of the scene and what was done, when, how and by whom.
- Chronological and careful documentation is important to ensure the “traceability” and “continuity” of the evidence throughout the process. The chain-of-custody establishes that what is produced in court relates to the specified item recovered from the scene.
- All subsequent examinations and analyses can be compromised if the chain-of-custody is not properly initiated and maintained at the scene.

Recognition, recovery and preservation of physical evidence

- ... Recognition, recovery and preservation of physical evidence is the central part of the work at the scene. It aims at locating and identifying a maximum of potentially relevant evidence, and selecting appropriate recovery methods and adequate packaging to preserve the evidence integrity.

Locating and identifying physical evidence at crime scenes, as well as identifying potentially missing evidence, is very challenging and is much more difficult and demanding than it might appear to those unfamiliar with crime scene investigation. The most relevant and important evidence may not be obvious or directly visible to the naked eye. The construction of an exhaustive listing of the steps to recognize evidence at crime scenes is not possible.

Typically the recognition of physical evidence starts by observing the scene. Based on initial observations and taking into consideration the context of the case, possible scenarios, the nature of the incident, as well as characteristics of surfaces that may bear potential evidence, a search strategy, which is both flexible and methodical, is implemented. This includes searching with the naked eye and magnifiers but also using various hand-held light sources. Basic testing procedures might have to be carried out to detect physical evidence, e.g. use of powders to enhance fingerprints at crime scene or the use of chemicals to visualize traces of blood.

Once the evidence is recognized, appropriate recovery methods (e.g. adhesive tape, tweezers, cotton tips) and adequate packaging (e.g. collection bags/boxes, containers for sharp objects) are used. Each piece of evidence is labelled and sealed following requirements as per local regulations. Priorities in evidence recovery might have to be decided to avoid unnecessary loss or degradation of evidence. Documentation is an integral part of the recovery process, including the precise location of the evidence before recovery.

Selecting what is relevant is the challenge of the recognition and recovery phase and is most efficient and effective when it takes place at the scene, where the potential evidence exists in the context in which it was produced. However, under difficult conditions it might be preferable to recover more evidence and select at a later stage of the investigation. Evidence recognition and recovery requires experience and extensive training. It also requires a good understanding of what can be done on the various types of physical evidence in a forensic laboratory as well as the information that can be obtained.

As part of the recovery process, in many instances, substrate samples and background samples are necessary, e.g. when collecting fire debris. In situations where the evidence

may be very large, representative sub-samples are usually collected, e.g. from bulky drug seizures. Sampling activities require experience and training.

Finally, it is recognized that in almost all cases physical evidence is missed and not recovered. Due diligence in recognition and recovery of physical evidence contributes to diminishing this factor.

WHY IS IT IMPORTANT?

- Relevant evidence that is present at the crime scene but that goes unrecognized cannot contribute to the solution of a case. It may be irretrievably lost or may send an investigation in a costly and unproductive direction.
- Recovery of only the most obvious and visible evidence may result in leaving the most relevant evidence behind.
- Adequate recovery methods avoid loss, degradation or contamination of the evidence.
- Indiscriminate evidence recovery might potentially overburden the laboratory with irrelevant items and thus hinder the investigation.

Transportation, storage and submission of evidence to the laboratory

❖ This last phase of the crime scene investigation process aims at selecting the means of transportation and storage that are appropriate for the type of physical evidence to ensure the integrity of evidence submitted to the laboratory.

Once physical evidence is recovered, the decision for further examinations in the laboratory has to be taken. Items more likely to provide information that will assist the investigation and/or those most likely to provide good analytical results, typically receive priority for submission to the forensic laboratory. Early involvement of laboratory personnel facilitates this decision.

Once decided, the transportation to the laboratory or to an intermediate storage location prior to examination of the evidence is a crucial step. Adequate conditions, e.g. a cool and dry place, and secured and controlled access are essential characteristics of transport and storage conditions. Also the costs, distance, timeframe and possible incompatibility between some evidence and some means of transportation are aspects to be considered when choosing how to relocate and store the evidence. The relocation of some type of physical evidence, e.g. drugs and firearms, may also require following existing local regulations.

Documentation of transportation, storage and hand-over to the laboratory is important. A written receipt is usually issued for all evidence submitted to the laboratory.

Physical evidence might have to be kept for many years, for instance, until the case has been adjudicated and all appeals exhausted. In those situations, a policy on long-term storage of exhibits is important and should be established and published, if it does not exist.

WHY IS IT IMPORTANT?

- To be useful to the case, the evidence that is recovered at the scene must ultimately reach a forensic laboratory in a way that maintains its integrity and identity.
- Adequate conditions will avoid degradation of evidence during the transport and storage.
- Secured access during transportation and storage will prevent any unauthorized access and possible tampering or loss of evidence.



Types of physical evidence potentially present at crime scenes, and their evidential value

This table provides an exemplary compilation of physical evidence that can be present at, and recovered from, a crime scene and of the information that can be obtained from its subsequent forensic examination. It also presents examples of cases where the different types of physical evidence might be encountered.

Note: This table is neither an exhaustive nor a comprehensive list and should be used as an illustration.

WHAT CAN BE PRESENT AT AND RECOVERED FROM A CRIME SCENE?		Evidential value: Information that can be obtained from forensic examinations	Examples of cases where the physical evidence might be encountered	Special considerations
🔪 POWDERS 🔪 LIQUIDS 🔪 TABLETS 🔪 INVISIBLE TRACES OF POWDERS 🔪 PLANT/VEGETABLE MATERIAL	Suspected materials of this type may contain illicit drugs	<ul style="list-style-type: none">• Detection and identification of suspected materials as drugs or precursors; determination of the purity, source, manufacturing methods	<ul style="list-style-type: none">◦ Drug production, trafficking and/or abuse	<ul style="list-style-type: none">- Secured transport and storage to avoid disappearance of seizures suspected to be drugs- Safety measures when collecting material suspected to be illicit drugs or precursors
	Powders and liquid may contain explosives/traces of explosives.	<ul style="list-style-type: none">• Origin and cause of the fire or explosion.• Detection and identification of flammable liquid residues (accelerants) or explosives	<ul style="list-style-type: none">◦ Terrorism◦ Property damage◦ Homicide◦ Accidental explosion	<ul style="list-style-type: none">- Safety measures when collecting material suspected to be explosives
	Includes explosives/traces of explosives			
🔪 DETONATING / DEFLAGRATING MATERIALS				
🔪 FIRE DEBRIS	Fire debris includes substrates that can potentially contain flammable liquid residues (accelerants)		<ul style="list-style-type: none">◦ Natural disaster◦ Accidental fire◦ Arson	<ul style="list-style-type: none">- Specific bags/containers to prevent loss of possible volatile compounds- Importance of collection of substrate samples/background samples

❖❖❖ BURN PATTERNS ❖❖❖ BLAST CONSEQUENCES			<ul style="list-style-type: none">o Terrorismo Accidental explosion/fireo Natural disastero Homicideo Arson	<ul style="list-style-type: none">- Importance of photographic records of such patterns/damages- Safety measures: booby trap or secondary explosives devices
❖❖❖ FINGERMARKS (VISIBLE or INVISIBLE, 2D or 3D)	Fingermarks may contain sufficient material to perform DNA analysis	<ul style="list-style-type: none">• Identification of the person at the source of the fingerprints	<ul style="list-style-type: none">o All cases where an item or surface may have been handled by the offender using bare hands, e.g.:<ul style="list-style-type: none">o Fingermarks on drug packageso Labour exploitationo Burglaryo Stolen motor vehicleso Homicide	<ul style="list-style-type: none">- Easily destroyed (very fragile!)- Gloves can prevent depositing own fingerprints but do not prevent destruction of evidential fingerprints that may be present- Easy contamination and degradation of biological samples
❖❖❖ SHOEMARKS (VISIBLE or INVISIBLE, 2D or 3D)		<ul style="list-style-type: none">• Brand and model of a shoe/tyre• Identification of a particular shoe/tyre as being at the source of the mark	<ul style="list-style-type: none">o Burglaryo Homicide	<ul style="list-style-type: none">- Marks in an outdoor environment will be destroyed by rain/snow
❖❖❖ TYREMARKS (VISIBLE or INVISIBLE, 2D or 3D)		<ul style="list-style-type: none">• Estimation of the breaking distance (vehicle)• Reconstruction of the road accident	<ul style="list-style-type: none">o Traffic accidento Hit and run	

WHAT CAN BE PRESENT AT AND RECOVERED FROM A CRIME SCENE?		Evidential value: Information that can be obtained from forensic examinations	Examples of cases where the different types of physical evidence might be encountered	Special considerations
VISIBLE or INVISIBLE BIOLOGICAL MATERIAL: → SALIVA → BLOOD/BLOODSTAIN → SEMEN → HAIR → SPERM → SKIN CELLS	Such biological samples may contain sufficient material to perform DNA analysis	<ul style="list-style-type: none">Determination of the type of biological material (i.e. blood, saliva, etc.)Species from which the material originates (e.g. human vs animal)Identification of the person at the source of a biological material	<ul style="list-style-type: none">Violent crimesRapeTrafficking in persons: sexual exploitationHomicide	<ul style="list-style-type: none">Hazards associated with biological materialEasy contamination when handling biological samplesEasy degradation of biological samples (appropriate packaging and storage are critical)
	DEAD BODIES Full bodies or body parts, fresh, decomposed or skeletonized	<ul style="list-style-type: none">Body identificationCauses and manners of the deathTime since death	<ul style="list-style-type: none">Accidental deathNatural deathHomicideSuicideMass fatalitiesWar crimeNatural disasterTerrorism	<ul style="list-style-type: none">Hazards associated with biological materialEasy contamination and degradation of biological samplesProper and dignified management of the deadRespect and consideration for bereaved
→ HUMAN REMAINS	BONES Bones may contain detectable DNA	<ul style="list-style-type: none">Body identificationSpecies from which the bones originatesEvaluation of the sex and age of the victim		

	<p>TEETH</p> <p>Teeth may contain detectable DNA</p>	<ul style="list-style-type: none">• Body identification• Evaluation of the age of the victim	<ul style="list-style-type: none">• Teeth are particularly useful in cases involving decomposed and burned bodies	<ul style="list-style-type: none">- Many other types of physical evidence are potentially present on and in human remains, e.g. bullets, fibres- Importance of recording exact location and arrangement of the body prior to collection- Expertise of specialists in medical disciplines is crucial
❖ BITE MARKS	<p>Bite marks may also contain DNA from the saliva of the offender</p>	<ul style="list-style-type: none">• Identification of the person/animal at the source of a bite	<ul style="list-style-type: none">• Homicide/assault	<ul style="list-style-type: none">- Easy contamination and degradation of biological samples
❖ NON-VISIBLE TO DARK POWDER TRACES ON SHOOTERS' HANDS, ON GARMENTS AND AROUND WOUNDS	<p>Those dark particles may be gunshot/firearm discharge residues</p>	<ul style="list-style-type: none">• Estimation of muzzle-to-target distance• Identification of type of particles	<ul style="list-style-type: none">• Homicide/suicide with a firearm• Other crimes where a firearm has been discharged	<ul style="list-style-type: none">- Washing hands of shooter and clothes will remove particles- Handcuffing shooter may disturb the pattern distribution- Importance of protection of hands of deceased from external elements- Importance of sample collection as soon as possible after the incident (as loss is rapid)

WHAT CAN BE PRESENT AT AND RECOVERED FROM A CRIME SCENE?		Evidential value: Information that can be obtained from forensic examinations	Examples of cases where the different types of physical evidence might be encountered	Special considerations
❖ FIREARMS ❖ TOOLS		<ul style="list-style-type: none">• Information from the markings: manufacturer, serial number, country or place of manufacturer, codes, etc• Determination of the source of the firearm, i.e. authorized manufacturer or homemade /modified See also “toolmarks and marks on ammunition components” and “obliterated zone/serial number”	<ul style="list-style-type: none">◦ Trafficking in firearms◦ Organized crime◦ Armed violence◦ Homicide	<ul style="list-style-type: none">- Safety measures when collecting a firearm and making it safe.- Cutting edges of tools and characteristics within firearms can be easily modified (and need to be protected).- Many other types of physical evidence are potentially present on firearms or tools such as fingerprints, blood or paint
❖ TOOLMARKS ❖ MARKS ON AMMUNITIONS COMPONENTS	Those marks are any impression, cut, gouge, or abrasion caused by a tool, including marks on bullet and cartridge cases	<ul style="list-style-type: none">• Type of a tool/brand and model of a firearm• Identification of the tool/firearms at the source of the mark	<ul style="list-style-type: none">◦ Armed violence◦ Vandalism◦ Burglary◦ Homicide/suicide with firearms or other tools	<ul style="list-style-type: none">- Many other types of physical evidence are potentially present on or in the toolmark, such as paint or glass fragments

❖❖❖ OBLITERATED ZONE/ SERIAL NUMBER (OFTEN ON FIREARMS or MOTOR ENGINES)	Obliterated zone can also be observed on other devices, such as cameras, computers, optical and electro-optical devices	<ul style="list-style-type: none">• Visualization of obliterated serial number/logo	<ul style="list-style-type: none">◦ Stolen cars◦ Firearms trafficking	<ul style="list-style-type: none">- Importance of photo- graphic records of recovered serial number before they disappear
❖❖❖ IDENTITY/TRAVEL DOCUMENTS ❖❖❖ BANKNOTES ❖❖❖ OTHER OFFICIAL DOCUMENTS ❖❖❖ HANDWRITTEN/ TYPEWRITTEN NOTES ❖❖❖ SIGNED DOCUMENTS	Official documents contain security features in the form of copy-proof inks/colours, inclusions, special paper, etc	<ul style="list-style-type: none">• Typewriter/printer at the source of the written information• Authenticity of an official document• Author of hand- written texts and signatures	<ul style="list-style-type: none">◦ Suicide letter◦ Testament◦ Fraud◦ Official documents with security features:◦ Transnational organized crime (illegal crossing of borders)◦ Identity theft◦ Trafficking in persons/ smuggling of migrants◦ Currency counter- feiting◦ Counterfeit customs documents	<ul style="list-style-type: none">- Many other types of physical evidence are potentially present on documents, such as fingermarks, biological material (e.g. saliva), traces of drugs, shoe marks

WHAT CAN BE PRESENT AT AND RECOVERED FROM A CRIME SCENE?		Evidential value: Information that can be obtained from forensic examinations	Examples of cases where the physical evidence might be encountered	Special considerations
••••• TEXTILE FIBRES, THREADS, FABRIC ••••• HUMAN OR ANIMAL HAIR		<ul style="list-style-type: none">• Type and colours of clothes/textile/glass• Brand and model of a car (e.g. vehicle paint)• Narrow the identification of the source of such evidence and the type of activity that resulted in the transfer of material• Direction of impact for a fractured glass pane	<ul style="list-style-type: none">◦ Stolen car (cross transfer between clothes and car seat)◦ Use of carpet/blanket in an homicide case (transfer between blanket and body)◦ Violent contact (cross transfer between various items of clothes)	<ul style="list-style-type: none">- Easily lost- Importance of sequence of recovery methods to optimize the collection
	••••• PAINT FRAGMENTS (of variable size)		<ul style="list-style-type: none">◦ Hit and run◦ Car accident◦ Robbery (e.g. paint on the tool used to open a door, car, etc.)◦ Vandalism	
••••• GLASS FRAGMENTS (of variable size)			<ul style="list-style-type: none">◦ Burglary (broken window)◦ Hit and run	

❖❖❖ ELECTRONIC DEVICES, SUCH AS COMPUTERS, PERSONAL DIGITAL ASSISTANTS (PDA), MOBILE PHONES, DIGITAL CAMERAS, FAX MACHINES, GLOBAL POSITIONING SYSTEM (GPS) UNITS		<ul style="list-style-type: none">• Retrieve data from hard disk or other storage media• Retrieve deleted data• Derive sequence of actions on a computer• Nature of the recovered information (e.g. child pornography)• Location information from GPS data	<ul style="list-style-type: none">◦ Various forms of trafficking (trafficking in persons/smuggling of migrants)◦ Cyber crime◦ Child pornography	<ul style="list-style-type: none">- Switching on or off an electronic device may diminish the chance of retrieving information- Many other types of physical evidence are potentially present on electronic devices, such as fingerprints, biological material, traces of drugs
❖❖❖ URINE ❖❖❖ BLOOD ❖❖❖ SALIVA ❖❖❖ HAIR (i.e. samples collected from a living person)	Drugs and other suspected materials may be contained in body fluids (toxicology)	<ul style="list-style-type: none">• Presence of drugs/ other substances	<ul style="list-style-type: none">◦ Drug consumption◦ Poisoning cases◦ Intoxication	<ul style="list-style-type: none">- Easy contamination and degradation of biological samples

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