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# SPECIFIC ROLL OF LATEST CRIME SCENE KIT IN THE FIELD OF FORENSIC SCIENCE FOR ACCURATE INVESTIGATIONS TO POINT OUT THE CULPRITS

**Ahmed Bakhsh[1*], Sadia Shehzad[2]**

[1]Department of Forensic Science, The Islamia University of Bahawalpur, Pakistan
[2]University College of Conventional Medicine, The Islamia University of Bahawalpur

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## ABSTRACT

Crime scene kit is an important tool used in crime scene investigation for proper, efficient and legal collection and storage of evidence that is the backbone of any criminal investigations. It has a very essential purpose of handling all forms of evidence from the time it is collected at the crime scene till the time it is processed in the analytical laboratory. In forensic science, the crime scene kit serves an important role of how scientifically reliable and probative evidence is collected in a crime scene. It encompasses components and instruments for the collection, storage and examination of physical evidence, particularly DNA, fingerprints, and traces substances. Its working is very efficient due to avoiding compromise. Components of the kit are for instance, kindly used sterile swabs, protective clothing, finger print kits and the famous tamper-evident securing of evidence items. Used correctly, the crime scene kit guarantees forensic scientists have an accurate picture of the crime scene when conducting their tests in the laboratory in the aid of criminal investigations and the law.

**Keywords:** Crime scene kit, Evidence collection, Documentation, Chain of custody, Blood borne pathogens.

[*]**Corresponding Author.** E-mail: bakhshahmed464@gmail.com

## INTRODUCTION

A crime scene, often referred to as the "heart of an investigation," is a pivotal location where evidence can provide critical insights into the commission of a crime. The proper collection, preservation, and analysis of evidence at the crime scene play a crucial role in solving criminal cases and ensuring justice is served. To facilitate this essential process, law enforcement agencies and forensic experts rely on a specialized toolset known as the Crime Scene Kit. The Crime Scene Kit is a meticulously designed assortment of equipment and supplies that aid investigators in documenting, collecting, and securing evidence at the scene of a crime. It is a vital resource that allows forensic professionals to piece together the puzzle of events, identify suspects, and ultimately bring perpetrators to justice [**1**].

In this study, we will delve into the components and significance of the Crime Scene Kit. We will explore the key tools and techniques used by investigators and forensic specialists to effectively process crime scenes, high lighting their roles in maintaining the integrity of evidence and avoiding contamination. Additionally, we will discuss the importance of proper training and adherence to protocols when using these kits, as even the smallest oversight can have significant implications for the outcome of an investigation. Throughout the study, we will also touch upon the evolution of crime scene investigation techniques and how advancements in technology have transformed the capabilities of the Crime Scene Kit. Moreover, we will shed light on the challenges faced by law enforcement agencies when handling crime scenes and how the kit assists in overcoming these obstacles. By the end of this study, we will hope to provide a comprehensive understanding of the Crime Scene Kit's role in the criminal justice system and its crucial contributions to maintaining the rule of law. Let us embark on this enlightening journey into the world of forensic investigation and uncover the mysteries behind crime scene analysis and evidence preservation. A crime scene kit, also known as a forensic evidence collection kit, is a specialized set of tools and materials used by law enforcement and forensic investigators to properly and systematically gather, preserve, and document physical evidence at a crime

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scene. The purpose of a crime scene kit is to ensure the integrity and admissibility of evidence in a court of law and to facilitate the investigation process.

**Evidence Collection and Preservation**

The primary purpose of a crime scene kit is to collect various types of physical evidence found at the crime scene. This evidence can include fingerprints, DNA samples, hair and fibres, blood and other body fluids, weapons, shell casings, footprints, tool marks. A crime scene kit typically contains essential tools and materials that law enforcement and forensic professionals use to process and investigate a crime scene. The contents of the kit may vary depending on the specific requirements and jurisdiction. The kit contains materials that help preserve the collected evidence in its original state, preventing contamination, degradation, or loss of crucial information is named as preservation of evidence. Proper preservation ensures that the evidence remains admissible in court and maintains its integrity for further analysis [**2**].

**Documentation**

A crime scene kit includes tools for documenting the scene thoroughly. This typically involves photography and sketching to capture the location and position of evidence within the crime scene. Detailed notes are also taken to record the circumstances, conditions, and observations related to the collected evidence.

Chain of Custody: The kit helps maintain the chain of custody for all collected evidence. Chain of custody refers to the chronological documentation of the possession, handling, and transfer of evidence from the crime scene to the forensic laboratory and eventually to court. Maintaining a secure chain of custody is crucial to ensure the evidence's reliability and credibility in legal proceedings.

**Safety and Hygiene**

Crime scene kits usually include personal protective equipment (PPE) to protect investigators from potential hazards at the scene, such as blood borne pathogens, chemical substances, or dangerous materials.

Crime scene kits are designed with standardized protocols and materials to ensure consistency and professionalism across different crime scenes and investigations. This promotes the reliability and accuracy of the evidence collected. Crime scene kits are essential tools in the investigative process, helping law enforcement and forensic experts gather crucial evidence and build a solid case to bring justice to victims and hold perpetrators accountable for their actions. Properly collected and preserved evidence plays a vital role in solving crimes and supporting the criminal justice system [**3**].

**ELEMENTS OF CRIME SCENE KIT**

**Latex Gloves**

Gloves are used at the crime scene to prevent cross-contamination and protect investigators from potential hazards. Latex gloves are a crucial component of crime scene kits and forensic investigations. They are worn by investigators, forensic technicians, and other personnel to protect both the crime scene and themselves from cross-contamination. Latex gloves are used to prevent the transfer of DNA, fingerprints, and other trace evidence between different surfaces, which could compromise the integrity of the investigation. When handling evidence, investigators must wear clean latex gloves to avoid introducing their own DNA or other contaminants. These gloves are discarded and replaced after each use to prevent potential contamination from previous crime scenes. Latex gloves are very importance to prevent cross-contamination and act as a barrier between the investigator and the evidence, ensuring that no foreign materials are introduced to the crime scene. By wearing gloves, investigators prevent the transfer of their DNA, fingerprints, or other substances onto evidence items, preserving their integrity for analysis. Latex gloves protect investigators from potentially hazardous materials, such as blood borne pathogens, chemicals, or sharp objects that might be present at a crime scene [**4**].

**Protective Clothing**

Full-body suits or covers to provide safeguards to the investigators and prevent the transfer of evidence from contaminations. Protective clothing in a crime scene kit is essential for law enforcement personnel and forensic investigators to ensure their safety and prevent contamination of the crime scene. Crime scene kits typically include a variety of protective clothing items, which may vary depending on the specific requirements of the investigation. Here are some common types of protective clothing found in a crime scene kit.

Disposable gloves are of three types including disposable latex, nitrile, or vinyl gloves are used to protect investigators from direct contact with potentially hazardous materials and to avoid cross-contamination of evidence.

**Disposable Shoe Covers**

These covers are worn over regular footwear to prevent tracking of outside contaminants into the crime scene and to preserve trace evidence that might be present on the ground.

*Disposable Coveralls or Tyvek Suits*

Full-body coveralls or suits made from materials like Tyvek provide protection against biological and chemical hazards while also preventing the transfer of fibers, hair, or other trace evidence from the investigator to the crime scene and vice versa [**5**].

*Face Masks*

Face masks are worn to protect against airborne particles, biological hazards, and chemical fumes that might be present at the crime scene.

*Goggles or Eye Protection*

These protect the eyes from hazardous substances, liquids, or airborne particles that could pose a risk during the investigation. It's important for

investigators to wear and change their protective clothing as needed to prevent cross-contamination between different crime scenes or areas within the same scene. Proper use and disposal of these items are crucial to maintaining the integrity of the evidence and ensuring the safety of everyone involved in the investigation [**6**].

**Evidence Collection Bags/Containers**

Used to store and preserve different types of evidence, such as clothing, weapons, and biological samples. Crime scene kits typically contain various evidence collection bags and containers designed to preserve and secure different types of evidence found at crime scenes. These bags are crucial in maintaining the integrity and chain of custody of the evidence. Below are some common types of evidence collection bags found in crime scene kits.

*Paper bags*

These are often used for collecting and storing items such as clothing, fabrics, and other porous materials. Paper bags allow the evidence to breathe and prevent the growth of mold or other contaminants.

*Plastic bags*

Plastic bags are used for collecting non-biological evidence, such as weapons, tools, and other items. They are also used for packaging items that may contain moisture or bodily fluids, as plastic provides a barrier against leakage.

*Tamper-evident bags*

These bags come with security features like adhesive seals, tamper-proof labels, or unique numbering. They are used for evidence that requires an added level of security to ensure the chain of custody is maintained.

*Transparent bags*

Transparent bags are useful for evidence that requires visibility without opening the bag. This allows investigators to see the contents without compromising the evidence's integrity [**7**].

*Ziplock bags*

Ziplock bags are commonly used for small or trace evidence like hairs, fibers, glass fragments, or shell casings. They help prevent cross-contamination and loss of tiny pieces of evidence.

*Envelopes*

Envelopes are used for containing flat or small pieces of evidence, such as documents, letters, or photographs. They keep these items protected and organized.

*Biological evidence containers*

These containers are designed specifically for biological samples, such as blood, saliva, or other body fluids. They prevent contamination and maintain the integrity of DNA evidence. [**8**]

**Crime Scene Markers and Tapes**

Used to document and mark important points of interest within the crime scene, such as blood spatters, shell casings, and footprintsIn crime scene investigations, the use of crime scene kit markers and tape is crucial for organizing and documenting evidence at the scene. These markers and tape are used by law enforcement personnel, forensic experts, and investigators to ensure accurate recording and analysis of the crime scene. Here's an overview of crime scene kit markers and tape.

*Crime Scene Kit Markers*

Crime scene markers are numbered or lettered placards used to label and identify various pieces of evidence and important points within the crime scene. These markers help investigators maintain a systematic approach to documenting evidence and ensure that nothing is overlooked. Each marker is typically placed next to or near a specific item of evidence, such as a weapon, shell casing, bloodstain, or any other relevant object. The markers are often made of durable material, like plastic or cardboard, to withstand the conditions of the crime scene. They may come in various shapes, such as cones, triangles, or rectangles, to suit different purposes and provide clear visibility in photographs. Using these markers, investigators can create a visual record of the crime scene, helping to reconstruct events later during analysis and court proceedings.

*Crime Scene Kit Tape*

Crime scene tape, also known as barrier tape or police tape, is used to cordon off and secure the crime scene. It's typically made of bright-coloured plastic or fabric, such as yellow or red, with bold "Police Line Do Not Cross" or "Crime Scene" markings. The tape serves two primary purposes: a. Restrict Access: Crime scene tape is used to create a perimeter around the crime scene, preventing unauthorized personnel and the general public from contaminating or tampering with evidence. Only authorized individuals, such as investigators, forensic experts, and relevant personnel, are allowed inside the taped-off area.

**Cameras and Photography Equipment**

For capturing detailed images of the entire crime scene and individual pieces of evidence. Duly establishing the scene ensures that essential details are captured for analysis and use in court proceedings. Then are some typical cameras and photography outfit that might be set up in a crime scene tackle 1.Digital SLR Camera a high- quality digital single- lens kick back ( DSLR) camera with exchangeable lenses is generally used for crime scene photography. DSLRs give excellent image quality and homemade control over settings like orifice, shutter speed, and ISO, allowing forensic shutterbugs to capture detailed and accurate images. 2. Wide- Angle Lens a wide- angle lens (generally around 10- 24 mm) is useful for landing overall shots of the crime scene, furnishing a broad view that helps contextualize the substantiation. Macro Lens are a macro lens (around 60- 100 mm) used for close-up photography of small pieces of substantiation, similar as fingerprints, tool marks, or trace substantiation. This lens allows shutterbugs to capture intricate details. 4. Tripod A sturdy tripod

helps stabilize the camera, especially in low-light conditions or when using slower shutter pets. This reduces the threat of vague images. 5. External flash units or lighting outfit may be used to illuminate the scene duly, especially in low- light or inner surroundings. Proper lighting ensures that the details are well- illuminated and visible in the photos. 6. Substantiation Labels These are small, numbered posters or labels that are placed near or next to pieces of substantiation. They help identify and source specific particulars in the photos. 7. Measuring Tape recording and sovereign A measuring tape recording and sovereign are essential for spanning the crime scene directly in the photos. They help maintain the proper proportionality of objects and distances. 8. Folding Reflective Scale A folding reflective scale is a tool that's used to insure proper exposure settings and correct color representation in photos. 9. Tablet and Pens Crime scene shutterbugs frequently make notes about the scene, camera settings, and any other applicable details that can prop in the analysis of the photos. 10. Camera Accessories Extra batteries, memory cards, lens cleaning tools, and camera bags are essential to insure the shooter is well- set and suitable to handle different scripts during the disquisition. It's important to note that specific outfit in a crime scene tackle may vary depending on the governance, agency, or specific conditions of the disquisition. also, forensic shutterbugs admit technical training to insure they capture images that directly represent the scene without polluting or altering substantiation [**9**,**10**].

**Fingerprinting Supplies**

Includes fingerprint powder, brushes, lifting tape, and cards for collecting and preserving fingerprint evidence. A crime scene kit for collecting fingerprint evidence typically contains various supplies and tools needed to properly gather, preserve, and analyze fingerprints. Here are some common items you might find in a crime scene kit for fingerprint collection: fingerprints on specific surfaces

*Fingerprint Powder*

Various types of fingerprint powders are used to develop latent (invisible) fingerprints. They come in different colors such as black, white, gray, and other colors that contrast with the surface being examined.

*Brush*

A small, soft-bristled brush is used to apply fingerprint powder to the surface where fingerprints are suspected to be present. The brush should be gentle to avoid damaging the prints.

*Fingerprint Lifting Tape*

Specialized adhesive tapes are used to lift developed fingerprints from surfaces. The tape is carefully placed over the fingerprint, gently pressed to lift the powder and the impression, and then transferred to a fingerprint card or backing for preservation.

*Fingerprint Cards*

These are cards with a standard format used to collect and preserve lifted fingerprints. Each card has designated areas for recording details about the crime, the location of the fingerprint, and other relevant information.

*Fingerprint Ink Strips*

In some cases, inked prints may be needed. Ink strips are used to take rolled fingerprint impressions from individuals for comparison purposes.

*Applicators and Swabs*

Applicators and swabs can be used to apply various chemical reagents to enhance or preserve [**11**].

**DNA Collection Kit**

Swabs and containers for collecting biological samples like blood, A crime scene kit, also known as a forensic evidence collection kit, is a package of tools and supplies used by law enforcement and forensic investigators to collect, preserve, and transport various types of evidence from a crime scene. The kit may contain specialized tools for gathering different types of evidence, such as DNA, fingerprints, fibers, blood, and more. For DNA collection specifically, the kit may include the following items:

*Swabs*

Cotton-tipped swabs used to collect biological material like saliva, blood, or touch DNA from surfaces.

*Collection envelopes*

Sealed envelopes to store the swabs and prevent contamination.

*Sterile water or buffer solution*

Used to moisten the swabs for better DNA sample collection.

*Disposable gloves*

Worn by the investigator to avoid contaminating the evidence.

*Labels and evidence seals*

To properly mark and seal the evidence containers for chain of custody purposes.

*Crime scene documentation forms*

To record details about the location, date, time, and description of the evidence collected.

*Importance of DNA Kit*

It’s important for investigators to follow strict protocols during the evidence collection process to prevent contamination and ensure the integrity of the evidence for use in court proceedings. Proper handling and documentation are crucial to maintaining the chain of custody, ensuring that the evidence collected can be traced and accounted for from the crime scene to the laboratory and eventually to the courtroom. It’s worth noting that crime scene kits may vary depending on the jurisdiction, the type of crime, and the resources available to the investigating agency. Additionally, advancements in forensic technology may lead to updates and improvements in the tools and procedures used for evidence collection over time saliva, or other bodily fluids for DNA analysis. [**12**]

**Tweezers, Forceps, and Scalpel**

Used for delicate evidence handling and recovery. A crime scene kit typically includes a variety of tools and equipment to aid in the collection and preservation of evidence. Two essential items in such a kit are:

*Forceps*

Forceps are small, pincer-like instruments used for delicate handling of evidence at a crime scene. They can be used to pick up small items, such as hair, fibers, or glass fragments, without contaminating or damaging them. Forceps come in various shapes and sizes to accommodate different types of evidence [**13**].

*Tweezers*

Tweezers are similar to forceps but are generally smaller and more precise. They are ideal for picking up extremely tiny or fragile pieces of evidence, such as minute particles or trace materials, and are useful in situations where fine motor control is necessary. These instruments are crucial for crime scene investigators to ensure that evidence is collected carefully and accurately, preserving its integrity for forensic analysis.

**Flashlights**

To aid in examining the crime scene, especially in low-light conditions. crime scene kit flashlight, often referred to simply as a "flashlight," is an essential tool used by law enforcement personnel, forensic investigators, and other professionals during crime scene investigations. These flashlights are designed to provide bright and focused illumination in various environments, including dark or low-light conditions. They typically have specific features and attributes that make them well-suited for crime scene work. Here's a brief overview of the main characteristics of a crime scene kit flashlight.

*Brightness*

Crime scene flashlights are powerful and emit a high lumen output to illuminate the area effectively. This helps investigators spot and document evidence accurately.

*Adjustable beam*

Many crime scene flashlights offer an adjustable beam, allowing users to switch between a focused spotlight and a wider floodlight, depending on the specific investigative needs.

*Forensic light filters*

Some flashlights come with additional filters to reveal and highlight certain types of evidence, such as bloodstains or fingerprints. These filters can enhance the visibility of otherwise hard-to-see evidence [**14**].

*UV light capability*

Crime scene flashlights may include UV (ultraviolet) light functionality to detect bodily fluids, certain chemicals, or other substances that fluoresce under UV illumination.

**Table 1:** Comparison of different camera brands used in crime scene kit.

| **Brand name** | **Nikon D 3500** | **Nikon D850 FXSLR** | **Canon DSLR EOS 90D** |
|---|---|---|---|
| Efficiency | Light weight for long work | Has best resolution | Have connectivity channels |
| Compatibility | Bright with 91000 dots and compatible with smart phones | Backside illuminated for best light intake | Good battery life and with stand harsh elements |
| Price | 553$ | 9796$ | 1199$ |
| Quality | Affordable price with seamless data sharing | Faster and accurate | Can shoot upto 4k quality |



**Figure 1:** Modern crime scene kit.

**Measuring Tools**

Rulers, measuring tapes, and laser measuring devices for accurately documenting the crime scene layout and distances between evidence. In a crime scene kit, one of the essential tools for investigators is a measuring tool. This tool is used to accurately document the dimensions and layout of the crime scene, which is crucial for investigations, evidence analysis, and courtroom presentations. The measuring tools in a crime scene kit typically include:

*Measuring Tape*

A flexible and retractable tape used to measure distances in both straight lines and curves. Measuring tapes come in various lengths, but common ones used in crime scene investigations are typically 25 feet (7. 6 meters) or longer.

*Ruler/Scale*

A rigid ruler or scale is used for precise measurements of small objects, such as collecting evidence like shell casings, footprints, or blood spatter patterns.

*Laser Distance Measurer*

In some advanced crime scene kits, investigators may have a laser distance measurer. This device uses laser technology to measure distances quickly and accurately, especially useful for larger crime scenes or hard-to-reach areas.

*Plumb Bob*

A plumb bob is a weighted object attached to a string used to determine vertical alignment or to create accurate reference points on the floor or walls [**15**].

*Evidence Collection Swabs and Containers*

For collecting trace evidence like fibers, hair, or small particles.

*Cleaning and Swabbing*

In some cases, investigators may use sterile water to clean certain surfaces or objects at the crime scene to remove dirt, blood, or other contaminants. Gauze can be used for gentle swabbing or collection of trace evidence like biological fluids or fibers. Bloodstain Documentation: Sterile water might be used to moisten dried bloodstains for better visualization and documentation.

**Luminol and Bluestar Reagent**

Chemicals used to detect bloodstains that may not be visible to the naked eye. As of my last update in September 2021, luminol and Bluestar are two chemical reagents commonly used in crime scene investigation kits to detect the presence of bloodstains that are not visible to the naked eye. These reagents help investigators identify potential blood evidence even when it has been cleaned or is not immediately apparent.

*Luminol*

It is a chemical compound that reacts with the hemoglobin in blood, producing a chemiluminescent glow (a blue-green light) when it comes into contact with blood residues, even if they have been diluted or washed away. The reaction occurs in the presence of certain metal ions, such as iron, which is present in hemoglobin. Luminol is particularly useful for locating traces of blood at crime scenes that might otherwise go unnoticed [**16**, **17**]. The luminol reaction is sensitive and can detect bloodstains that have been altered or cleaned up. However, it is essential to use this reagent in low-light conditions to observe the faint glow effectively. Moreover, luminol may also react with certain other substances (e.g., bleach, copper ions, certain cleaning agents) producing false positives, so further confirmatory tests are necessary [**18**].

*Bluestar*

It is another forensic reagent used for the detection of bloodstains. It is based on a different chemical reaction from luminol but serves a similar purpose. Bluestar comes in different formulations, like Bluestar Forensic and Bluestar Identikit, and it can also react with the heme group in hemoglobin, resulting in a luminescent response in the presence of blood. Bluestar claims to be more sensitive and less likely to produce false positives compared to luminol [**19**].

**Gauze and Sterile Water**

To collect wet or bloody evidence, such as a bloodstained cloth.

*First Aid*

Gauze and sterile water are basic first aid supplies that can be used to treat minor injuries sustained by investigators or personnel at the crime scene.

*Cleaning and Swabbing*

In some cases, investigators may use sterile water to clean certain surfaces or objects at the crime scene to remove dirt, blood, or other contaminants. Gauze can be used for gentle swabbing or collection of trace evidence like biological fluids or fibers.

**Notepads, Pens, and Markers**

For documenting observations and notes during the investigation. It's essential for investigators to be well-trained in using these tools and following proper protocols to maintain the integrity of the crime scene and the evidence collected. Additionally, specialized kits might be included for specific types of crime scenes, such as arson investigation or hazardous materials incidents [**20**].

**CONCLUSION**

It is concluded that a crime scene kit can vary depending on the specific context or purpose. Generally, a crime scene kit is a collection of tools and materials used by forensic investigators and law enforcement personnels to document, preserve, and collect evidence at a crime scene. The goal is to ensure the integrity of the evidence and maximize the chances of successful investigation and prosecution. Some key points and conclusions related to a crime scene kit. The kit includes various items such as fingerprinting tools, evidence bags, swabs, tape, and other specialized equipment for collecting physical evidence like fingerprints, DNA, hair, fibres, and more. The proper use of these tools

ensures that evidence is gathered in a manner that preserves its integrity and prevents contamination. A crime scene kit often contains notepads, pens, measuring tape, and cameras to document the scene thoroughly. Investigators must record details about the location, the position of evidence, and any other relevant information to recreate the crime scene accurately. Protective Gear: Crime scene kits typically include personal protective equipment (PPE) like gloves, shoe covers, and masks to prevent cross-contamination and protect the investigators from potential hazards. Maintaining a chain of custody is crucial for the admissibility of evidence in court. A well-equipped crime scene kit should include seals and labels to secure evidence containers and ensure a clear and unbroken chain of custody.

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