Forensic Technology
CENTER OF EXCELLENCE
A program of the National Institute of Justice

GUIDANCE DOCUMENT

Considerations for Photographic Documentation in Sexual Assault Cases

"SANEs are a valuable resource within the SART because they assume the role of photographer and care provider during the sexual assault medical forensic examination. Their expertise should be acknowledged and supported by having access to funding and training opportunities to sustain their specialization in the medical field and to ensure they are well-equipped to take high-quality photographs throughout the country."

—Marya Simmons, Founder and CEO, Shift in Notion Consulting, LLC

Introduction

In the United States, a sexual assault occurs every 68 seconds.[1] Sexual assault is a violent crime that inflicts trauma on survivors and threatens public safety. As part of the healing process, survivors may seek medical attention for the physical injuries and psychological traumas sustained as a result of their assault.

Sexual Assault Nurse Examiners (SANEs) are medical professionals with specialized training and expertise in medicine, psychology, and forensic science. Because of this training, SANEs are qualified to conduct sexual assault medical forensic examinations (SAMFEs), which may include providing general medical care to patients, documenting abnormal findings (e.g., physical trauma), collecting evidentiary items, and providing access to prophylactic treatment or additional medical referrals as needed.[2] During a SAMFE, which is contingent on obtaining patient-provided informed consent, SANEs may document their observations of injuries associated with a sexual assault through photography. Photographs provide a permanent record of injuries sustained by the patient and may also be used for court proceedings, if the patient decides to engage with the criminal justice system.

Objectives

- Provide background for the importance of photo documentation during sexual assault medical forensic examinations.
- Offer a high-level overview of photography techniques and digital camera technologies applicable to the documentation of injuries and evidence associated with sexual assault cases.
- Emphasize trauma-informed and victim-centered approaches to completing photography during the sexual assault medical forensic examination.
- Highlight the importance of a multidisciplinary approach to establishing photography and photo documentation practices and procedures for sexual assault cases.

This report was updated in March 2024 to incorporate minor terminology revisions to the original August 2022 publication, including a transition from the use of multidisciplinary team to sexual assault response team and sexual assault forensic examination to sexual assault medical forensic examination to better align with language used within national protocols and best practice guidance documents.

Photography technology is continually evolving. Many best practice guidelines and protocols recommend that SANEs use photography equipment that captures forensic-quality photographs (i.e., are admissible in court). A wide variety of digital cameras address SANE needs, including options capable of manual parameter adjustments (e.g., digital single lens reflex, mirrorless, converted cameras) and options capable of only pre-configured parameters (e.g., colposcopes and integrated camera systems, which are specifically designed for use in clinical settings; point-and-shoot cameras). SANEs may weigh several considerations when choosing a camera appropriate for their needs, including the technical and operational complexity of the camera, how the product integrates in their organization's workflows, and resources available for product procurement and implementation.

Although not exhaustive, this document presents insights on photographic techniques, available camera and accessory options suitable for SAMFEs, and considerations for ensuring the process of photographing patients remains trauma-informed and victim-centered. This document also highlights the importance of a multidisciplinary approach to both SAMFEs and subsequent investigations, which involves professionals including SANEs, victim advocates, law enforcement investigators, forensic science service providers (FSSPs), and prosecutors.

For this document, the FTCOE has defined the following terms:

Sexual Assault: Sexual assault includes "[A]ny nonconsensual sexual act proscribed by Federal, Tribe, or State law including when the victim lacks capacity to consent."[3]

Evidence: Items of potential forensic relevance, which may include injuries (e.g., bruising), pattern and impression evidence (e.g., bite marks), trace evidence (e.g., hairs and fibers), and biological fluid traces (e.g., blood and semen) observed on a patient by a SANE during the SAMFE.

Patient and Survivor: This document is primarily intended for SANEs. As such, the term "patient" is used to describe individuals who are undergoing a SAMFE. The term "survivor" is also used when not discussing considerations related to individuals undergoing a SAMFE.

Although this document focuses on the role of the SANE in documenting sexual assault injuries via photography, photography may also be used to document injuries in a variety of cases, including strangulation, assault, domestic violence, intimate partner violence, and elder or child abuse.

SAMFEs and subsequent investigations require the collaboration of the following sexual assault response team (SART) members to ensure the process is completed in a victim-centered manner. The critical roles and responsibilities of SART members include the following:

SANEs: Provide immediate medical care, conduct the SAMFE, and provide follow-up care to the patient as needed.

Victim Advocates: Serve in a liaison role for the sexual assault survivor by providing information, support, resources, and investigation updates.

Law Enforcement Investigators: Lead the sexual assault investigation by communicating with the survivor and SART members and through reviewing information and evidence gathered during the SAMFE.

FSSPs: Conduct forensic testing on evidentiary items related to the case (e.g., sexual assault kit [SAK] samples) and provide information on the impact test results may have on investigative advancement.

Prosecutors: Collaborate with the survivor and all SART members to seek case advancement and resolution.

A SAMFE includes evidence documentation.

During a SAMFE, SANEs may provide general medical care to the patient, intake a patient's forensic medical history, and conduct an examination. This examination may include a full or partial body examination (depending on the information recounted by the patient about the sexual assault),[6] collection of evidentiary samples for a SAK, and documentation of the examination and any injuries resulting from the sexual assault via photographs.[6] To best support a patient, SANEs employ a **trauma-informed** and **victim-centered** approach during the SAMFE,[2] and focus on a patient's needs related to treatment and healing as well as documentation and collection of evidence.[7]

Trauma-Informed and Victim-Centered Approaches

Trauma-Informed: An approach that recognizes the widespread impact, signs, and symptoms of trauma to actively avoid re-traumatizing the patient and to promote recovery-oriented care.[4]

Victim-Centered: An approach that prioritizes the rights, needs, and wishes of the patient to promote empowerment and ensure access to high-quality health care, legal services, emotional and social support, and security.[5]

Separate informed consent is necessary for photo documentation and evidence collection.

A SAMFE includes two separate consent processes. Separate patient-provided informed consent is required for (1) medical evaluation and treatment (which may include photographic documentation) and (2) evidence collection and release (which may include releasing evidence and information to SART members or other criminal justice system personnel).[2] Although dependent on an organization's policy, informed consent is recommended to be obtained in the form of written and verbal consent.[2] To ensure patient-provided consent is informed, SANEs supply thorough information to the patient about the SAMFE, including what the procedures entail, the potential side effects, and any confidentiality limitations.[2] Additionally, SAMFE consent forms should include what types of photographs will be taken, who will have access to them, and how they will be used, stored, and secured.[2] SANEs may also hold the responsibility of explaining the potential impacts of declining a procedure as it relates to overall care, evidence collection, criminal investigations, and prosecution considerations if an advocate is not available.[2] *A National Protocol for Sexual Assault Medical Forensic Examinations – Adults/Adolescents Second Edition* recommends that written consent forms are signed and dated by the patient and that reasons for declining a procedure are documented in the medical record or on the forensic report forms.[2] The patient reserves the right to decline any or all portions of the SAMFE. Furthermore, the patient reserves the right to withdraw their consent at any time, which immediately halts the SAMFE and the subsequent forensic testing of any evidentiary items that may have been collected (if applicable as dependent upon the consent provided by the patient).

The Role of Forensic Photography in SAMFEs

Photographs depict what was observed by the SANE during a SAMFE and permanently document injuries that can change or fade as a result of healing.[8] Although photo documentation is significant for patients who present observable injuries, it is equally important in instances where visible injuries may be absent or no abnormal findings are noted.[9] Furthermore, photo documentation provides a mechanism that enables examination findings and injury evaluations to be peer reviewed by fellow colleagues, which is a critical component of SANE practice.[10] The following types of photographs are helpful to obtain during a SAMFE because they provide a holistic view of any evidence observed during the examination:

- **Identification photographs** presenting information such as the patient's medical wristband or a prepared label/card indicating the date, time, case number, patient's name and date of birth, and other available health care–related and case–related information to signify the beginning and end of the patient's photography log.[11]
- **Full body photographs** capture an overall view of the patient as they initially appear for the SAMFE.[12] These photographs are taken in four views (front, back, and left and right sides) and document the condition of patients' clothing and visible injuries in anatomical orientation.[11]
- **Mid-range photographs** capture a point of interest in relationship to a landmark on the body (e.g., a photograph of a bruise on the right cheek that includes a full profile of the face). SANEs progress by systematically examining and photographing each area of the body to ensure injuries are not overlooked.[11]
- **Close-up photographs** of each injury to capture fine details and higher resolutions. Close-up photographs include the following variations: an in situ photograph, a photograph with a ruler or scale, and a photograph that depicts the injury as close as possible without compromising resolution quality, if needed.[11]

The following demonstrate the importance of photo documentation in a clinical setting:

1. To document injuries and potential evidence that cannot be preserved indefinitely or may be altered by treatment.
2. To capture injury appearance before and after medical intervention(s).
3. To act as a future aid to memory.
4. To document details that may not be important for purposes of care and treatment but may support an investigation (e.g., the condition of clothing worn by the patient).
5. To document normal findings or absence of injuries.
6. To document wound healing progress in follow-up examinations.
7. To provide a visual supplement to the medical record.
8. To provide teaching, peer review, and quality improvement.
9. To minimize bias.
10. To provide material that can be reviewed by consulting professionals prior to court proceedings.

Adapted from Sievers and Faugno.[9]

In addition to photographing the patient and any injuries, the SANE may photograph evidence or unusual findings on the patient or their clothing, including biological fluid traces (e.g., blood or semen), pattern and impression evidence (e.g., bite marks), trace evidence (e.g., hairs or fibers), and debris (e.g., dirt or gravel).[7] Furthermore, SANEs may take follow-up photographs should the need arise—for example, to document injuries not realized or readily apparent during the initial SAMFE (e.g., a deep, non–surface-level bruise).[2]

Best practice guidelines and protocols help enable rigorous, high-quality SAMFEs and care.

Photography following a sexual assault can be an invasive and uncomfortable experience for the patient.[13] Best practices can help organizations implement standardized workflows focused around trauma-informed and victim-centered care. Intended to support local policies and procedures, these best practice documents emphasize the importance of providing a thorough explanation of procedures to patients, obtaining informed patient-provided consent, and ensuring documentation of a SAMFE is comprehensive and meticulous. ***Appendix A*** provides a non-exhaustive list of guidelines and protocols developed to help ensure that patients' needs are properly addressed while promoting the collaborative response of allied criminal justice professionals. Many of these documents provide specific considerations for photo documentation, including forensic photography training, storage of photographs, and release of photographs for investigative advancement; however, few guidelines directly mention commercially available types of photography equipment to document injuries. For example, *A National Protocol for Sexual Assault*

Medical Forensic Examinations—Adults/Adolescents Second Edition notes that "Photographic equipment should be used that can clearly document the level of injury. Consult with local criminal justice agencies regarding the types of equipment that should be used (e.g., prosecutors can assess which types of equipment produce results that are acceptable to the court)."[2]

Although best practice documents offer guidance on effective victim-centered photography, they typically do not recommend specific camera techniques and technologies.

Advances in photography technology have improved the level of fine detail being captured, allowing for efficient, high-quality photo documentation across multiple criminal justice applications, including SAMFEs. These advancements have led to the development of multiple technology options that SANEs may consider for photo documentation. Many best practices suggest that SANEs use forensic-quality photography equipment, allowing decision-makers freedom to choose equipment that fits their needs. When choosing photography equipment, SANEs or their administrators may consider the technical complexities and versatility of the equipment. ***The sections that follow provide an overview of photography techniques that may help visualize and document evidence and offer categories of camera products that may provide value to achieving high-quality documentation.***

Types of injuries that may be documented during a SAMFE include the following:

- Bruising that is fresh or has aged to varying degrees.
- Visible surface injuries, including abrasions, petechiae, lacerations, incisions, and hemorrhages.

Photography Techniques for SAMFEs

Historically, SANEs have relied on documenting evidence using conventional cameras to capture visible light. These cameras document evidence as it appears to the unaided eye. Technology advancements that allow cameras to sense and capture light at varied wavelength ranges—within the visible light spectrum and beyond—can help visualize and document evidence that may not be apparent to the unaided eye, providing a more thorough and accurate record of the patient's injuries. These photography techniques include the following approaches:

- **Visible light photography**, which is captured with a camera and a general light source (e.g., overhead lighting, white ring light).
- **Alternatives to conventional photography**, which requires illumination with a tuned light source, barrier goggles for visualization, and a barrier filter for photo documentation.

Alternative photography techniques used to visualize evidence include Alternate Light Source (ALS), Ultraviolet (UV), and Infrared (IR) photography.

"UV and IR can help visualize injuries in certain circumstances, but they should not be used in a vacuum. I'd recommend that UV/IR is used to augment, not replace, conventional forensic photography. SANEs should also consider ALS for more robust injury documentation."

—Heidi Nichols, Senior Forensic Photographer, Miami–Dade County Medical Examiner Department

For alternative photography techniques, such as ALS, UV, and IR, SANEs should consider the following:

- These techniques are not recommended for use in circumstances when a patient is unconscious or has a lapse in memory at the time of the SAMFE.

- These techniques improve visualization of injuries but are not diagnostic. The enhanced features can be used along with a SANE's observations and other information surrounding the sexual assault to reach consistency statements (e.g., the bluish-purple spot located on the patient's right arm is consistent with bruising demonstrated by results using ALS and information recounted by the patient regarding the sexual assault).

Visible Light Photography

Conventional camera technology documents what the human eye perceives from the **visible light spectrum**. The value for visible light photography remains steadfast for various forensic documentation applications as camera technology and equipment evolve.

Visible light photography helps document what the SANE observes during a SAMFE (e.g., a patient's visible injuries or lack thereof) and sets the context for the photography log (e.g., identification of the patient). Although this type of photography captures evidence as seen by the human eye, it may not capture the entirety of a patient's injuries. Bruising, for example, may be challenging to detect because of the age of the injury, the depth of the bruise under the skin, and the patient's skin pigmentation.[14] In addition, some evidence such as biological fluid traces (e.g., blood and semen) and trace evidence (e.g., hairs and fibers) on dark or heavily patterned backgrounds may not be visible without the use of alternative photography techniques, such as ALS, UV, and IR. Alternative techniques should be used *alongside* visible light photography and not as a replacement. The FTCOE conducted several interviews with SANEs who stated they use red- or green-colored physical lens barrier filters with a visible light source, such as a white ring light, to help visualize bruising or redness. This approach is similar, but should not be considered equivalent to, the use of ALS (discussed below), which uses a light source tuned to a specific range of light wavelengths and a barrier filter to enhance the SANE's view of evidence.

Visible Light Photography	
Benefits	▪ Captures observations as they are seen by the human eye ▪ Offers many products, ranging in price and quality ▪ Can be used to achieve full body, mid-range, and close-up photographs
Limitations	▪ Offers limited documentation of the patient's injuries (e.g., may not document those under the surface of the skin) ▪ Unable to document evidence invisible to the unaided eye (e.g., biological fluid traces or trace evidence on dark or patterned clothing) ▪ May not visualize impression and pattern evidence obscured by bruising
Minimum equipment needed	▪ Camera ▪ White light source

Alternatives to Conventional Photography

ALS, UV, and IR photography requires specific light wavelength ranges, and barrier filters such as an attachable camera lens or goggles to visualize evidence. UV and IR techniques require specialized cameras that allow light outside the visible light spectrum to reach the camera sensor, and complete darkness for image capture. These techniques require additional training and regular use to retain proficiency.[15]

Wavelengths of Visible Light (Approximate Ranges)	
Wavelength Range (nm)	**Color of Light**
630–700	Red
590–630	Orange
560–590	Yellow
490–560	Green
450–490	Blue
400–450	Violet
400–700	White

Exhibit 1. Approximate wavelengths of visible light typically available in an ALS. *Source: Nichols, H., & Sanfillippo, P. (2017). Alternate Light Source Workshop: Course material. Tritech Forensics.*

Photography Using Alternate Light Sources

ALS emit light at a specific range of wavelengths within the visible light spectrum (e.g., blue light, as shown in ***Exhibit 1***). SANEs can use an ALS with conventional cameras to illuminate a variety of evidence types, including injuries, biological fluid traces, and hairs or fibers. Light emitted by an ALS, known as **excitation wavelengths**, causes types of evidence to fluoresce or absorb the light. SANEs can visualize and document evidence made apparent by an ALS through the use of a barrier filter, which blocks light reflected to the viewer and makes previously obscured evidence visible. Types of barrier filters include goggles and lenses that are attached to the camera lens (examples of these barrier filters are highlighted in ***Exhibit 2***).

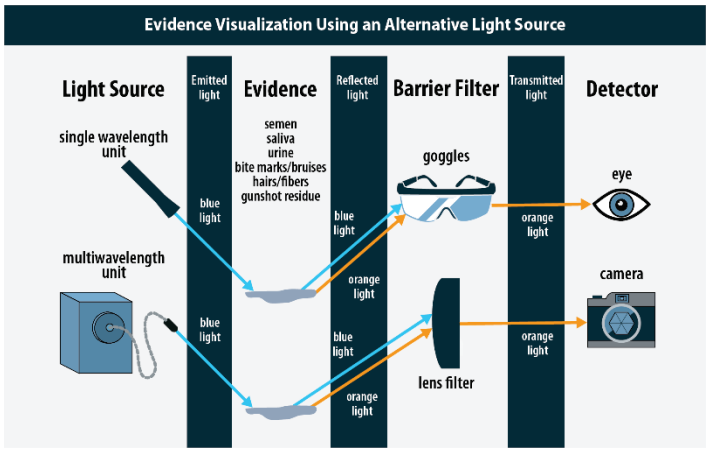


Exhibit 2. Visualization of "invisible" evidence using ALS requires a tuned light source and a barrier lens filter for camera detection and appropriate barrier goggles for detection by the human eye. *(Graphic used with permission from the FTCOE's Landscape Study of Alternate Light Sources.)*

Exhibit 3 shows photographs of a bruise taken with an ALS and traditional photography demonstrating the greater detail captured with an ALS. Using ALS to detect and document bruising is an active area of research especially relevant to SAMFEs, because previous studies have indicated th at ALS may help clinically detect bruising in cases of strangulation.[16]

A 2020 study by Scafide *et al.* found that an ALS at 415–450 nm coupled with a yellow barrier lens filter (consistent with the absorption peak of hemoglobin) was the most effective light and filter combination for visualizing bruising.[15] The same study also showed that

For more information on available types of ALS and considerations for implementing ALS technology, see the FTCOE's ***A Landscape Study of Alternate Light Sources***.

The National Institute of Justice has funded research projects to evaluate the value of ALS on the detection of bruising, which include:

- 2019-NE-BX-008: **Improving the Forensic Documentation of Injuries through Alternative Light: A Researcher-Practitioner Partnership**
- 2016-DN-BX-0147: **Analysis of Alternative Light in the Detection and Visibility of Cutaneous Bruises**

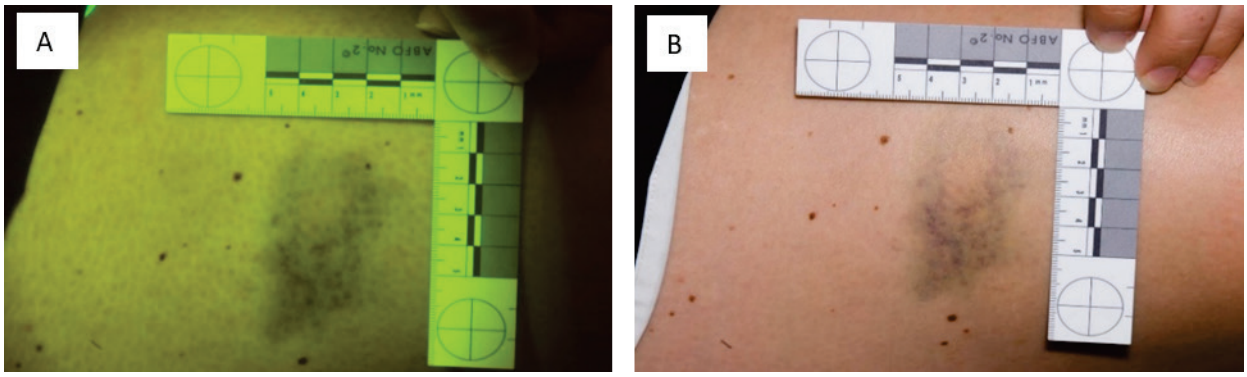


Exhibit 3. Use of an ALS tuned to blue light with a yellow barrier filter (A) can help visualize the extent of a bruise. *Compared to traditional photography (B), the ALS technique can show slightly better detail related to the size and shape of the bruise. (Photos provided by Heidi Nichols, Miami–Dade County Medical Examiner Department.)*

researchers were roughly five times more likely to observe bruising with an ALS compared with a white light across all skin tones, demonstrating that ALS may be better suited to detect injuries on darker pigmented skin than traditional white light.[15] SANEs can use ALS photography with several camera models if the lens is adjustable or detachable, but they will need to invest in an ALS as well as appropriate barrier filters to block the excitation light. Barrier lens filters attach directly onto a camera lens and are available in various sizes to fit a camera's lens.

Alternatively, a lens adapter may be used to fit a barrier lens filter to a camera lens if there is a size difference. Decision-makers can choose from several ALS products, including single wavelength range flashlights to instruments possessing multiple wavelength ranges.

ALS Photography	
Benefits	▪ Can help SANEs detect and document the extent of bruising under the skin ▪ May help SANEs identify injuries on darker pigmented skin with fixed wavelengths
Limitations	▪ Requires additional light sources and barrier filters for visualization and safety purposes
Minimum equipment needed	▪ Single or multiwavelength visible light source (more wavelengths preferred) ▪ Barrier lens filter ▪ Barrier filter goggles ▪ Camera that can accommodate a barrier lens filter (or lens adapter)

Ultraviolet Light

Although ALS in the blue and violet wavelength ranges has been shown to most effectively detect bruising,[15] UV light may help visualize bruises that are older and potentially more difficult to see.[17] A 2015 blunt trauma injury study by Glauche *et al.* indicated that examinations with UV light could identify hematomas older than 1 week more effectively than physical examination.[18] UV light waves enable the camera to capture features on the skin's surface because they cannot penetrate the skin, making this technique advantageous for visualizing superficial impression and pattern injuries.[19] For example, UV light can help visualize breaks (e.g., cuts and bite marks) in the

UV Light Photography	
Benefits	▪ May help detect bruises and superficial injuries like bite marks ▪ Detects biological fluid traces
Limitations	▪ May not be able to visualize deeper injuries ▪ May block UV light if the camera lens is coated
Minimum equipment needed	▪ UV light source ▪ Barrier lens filter ▪ Barrier filter goggles ▪ Camera that can accommodate a barrier lens filter (or lens adapter)

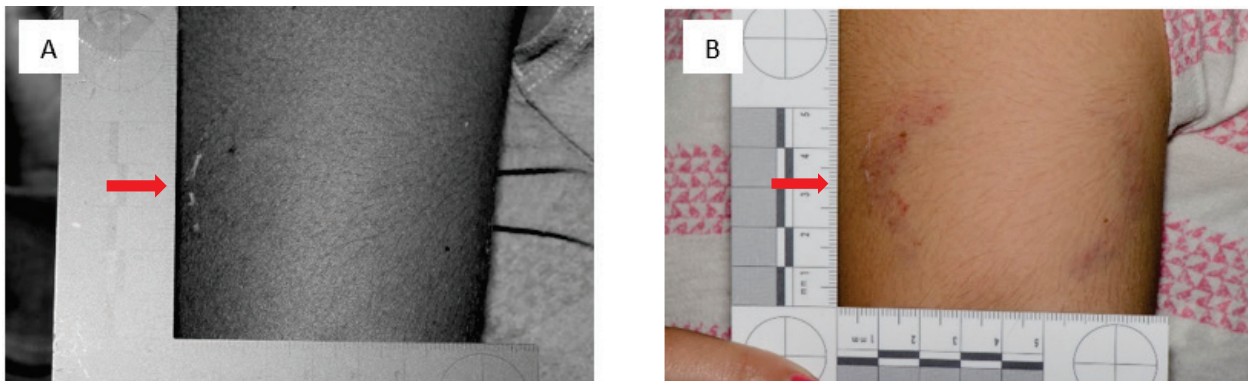


Exhibit 4. UV light, which has shallow penetration into the skin (A), is often less effective at visualizing bruises but can capture abrasions and breaks on the skin's surface. *Photo A, taken using a UV photography technique, captures the abrasions from a bite mark (shown by the red arrows), which can be helpful when bruising may obscure this detail with traditional (B) or ALS photography. (Photos provided by Heidi Nichols, Miami–Dade County Medical Examiner Department.)*

skin when bruises may otherwise obscure them.[19] Alternatively, the shallow penetration of UV light into the skin may preclude detection of deeper injuries as shown by ***Exhibit 4***.

Like ALS photography, UV photography requires the use of a UV light source for illumination, appropriate barrier filters for detection, and a lens adapter depending on the camera being used. For human subjects, only long-wave UV (i.e., UV-A, which ranges from 320 to 400 nm) can be used for injury detection because exposure to short-wave UV (i.e., UV-B and UV-C) may cause inflammation or damage to the skin similar to a sunburn.[20] Many camera lenses possess a coating that filters out UV light; as such, a lens without UV coating is needed to successfully allow this type of photography.

Kolari Vision offers **a list of UV-compatible lenses**, along with information on their performance. The webpage covers inexpensive "entry level" lenses and older lenses, which cost around $150 each, and quartz-based lenses, which may cost around $5,000.

Infrared Light

IR photography uses the IR-A region (i.e., Near IR), which ranges from 700 to 1,400 nm. Similar to UV, IR also extends to IR-B (i.e., Middle IR, which ranges from 1,400 to 3,000 nm) and IR-C (i.e., Far IR, which ranges from 3,000 nm to 1 mm); however, these ranges are not suitable for photography purposes.[21] IR light photography often plays an important role in crime scene investigations; a 2007 study by Chun-I Lee *et al.* suggested that IR light can detect impression evidence, trace evidence, and biological fluid traces on dark or patterned surfaces.[22] IR light penetrates up to 3 mm into the skin and can be used to visualize deeper bruising that might not be apparent using visible light, ALS, or UV light.[23] This technique might also help visualize injuries on darker pigmented skin. ***Exhibit 5*** demonstrates how IR photography captures a bruising pattern deeper into the skin. A 2017 study by Rost *et al.* showed that IR photography can be used to non-destructively detect bleeding below the surface of the skin and tattoo ink located between the epidermis and dermis.[23] However, because of the depth of light penetration, surface injuries could be obscured when using this technique. According to an article on UV/IR injury photography published by Klingle and Reiter, "unless the injury is deep—such as a severe bruise, bite wound, knife wound, or gunshot wound—IR will not capture the full extent of the injuries."[24] Like other alternatives to traditional photography, IR photography requires an IR light source and appropriate barrier filters (i.e., camera lens and goggles) to visualize and document the injury.

IR Photography	
Benefits	▪ Can help visualize deeper injuries ▪ Detects biological fluid traces on dark or patterned backgrounds ▪ May help visualize injuries on darker pigmented skin
Limitations	▪ May penetrate too deeply into the skin and fail to capture surface-level injuries
Minimum equipment needed	▪ IR light source ▪ Barrier lens filter ▪ Barrier filter goggles ▪ Camera that can accommodate a barrier lens filter (or lens adapter)

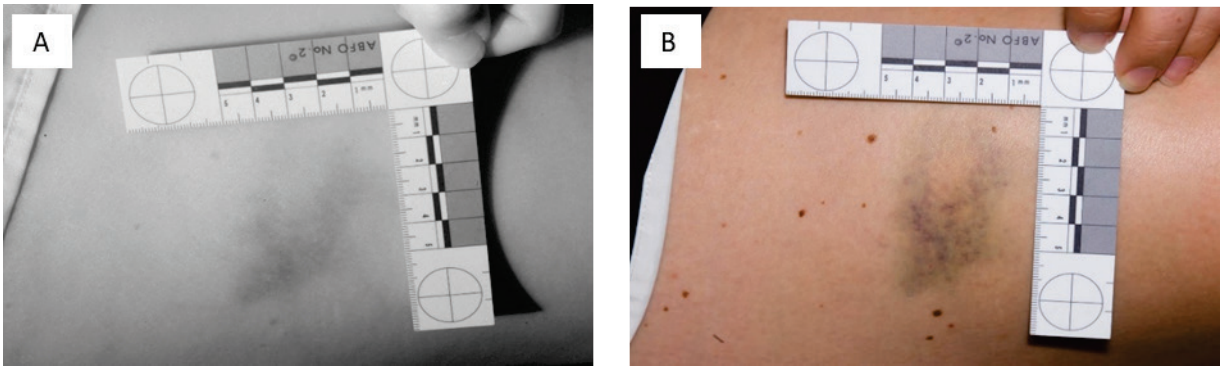


Exhibit 5. IR light can help visualize deeper bruising because of its ability to penetrate the skin. *Photo A, which captures IR light, does not capture the surface-level freckles and markings present on the skin like traditional photography (B). IR photography (A) can aid in the visualization of the deeper layer contact impression area, which unlike Photo A does not show surrounding surface-level bruising around this contact area. This may provide insight to the size or shape of the object or item used to produce the injury. (Photos provided by Heidi Nichols, Miami–Dade County Medical Examiner Department.)*

Digital Camera Options for SANEs

A wide variety of digital cameras are available on the market. These cameras capture digital images and store them via a removable Secure Digital (SD) card or via local, network, or cloud storage. Many brands and models could fit the needs of SANEs, though the decision-maker should consider specifications dictated by department policy. Based on interviews conducted by the FTCOE, SANEs may use the following camera types for SAMFEs.

Options with manually adjustable and automated parameters:

- Digital Single Lens Reflex (DSLR) Cameras
- Mirrorless Digital Cameras
- Converted Cameras

Options with pre-configured parameters:

- Integrated Camera Systems[a]
- Colposcopes[a]
- Point-and-Shoot Cameras

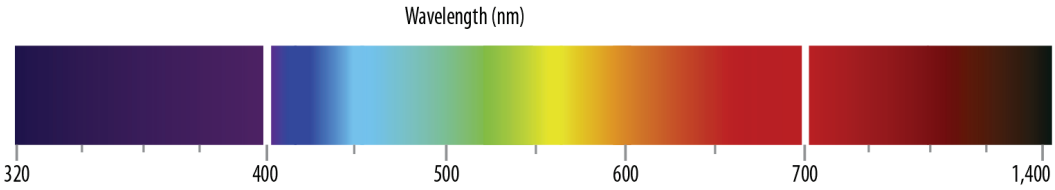
Product references are not intended as recommendations or endorsements of a specific technology, product, or equipment by any practitioner, organization, or agency named within this report—the specific cameras and vendors named within this guidance document are provided as examples of available digital camera and accessory options based on input from subject matter experts.

Although SANEs may look to leverage visible light, ALS, UV, and IR photography techniques during the SAMFE, not all camera types accommodate the same techniques. ***Exhibit 6*** provides an overview of cameras capable of documentation using these various photography techniques.

When choosing one or more camera options, department decision-makers must consider the technical and operational complexity of the camera (i.e., how much training may be necessary to successfully operate the camera) and its versatility (i.e., how it can be used for the SAMFE and how many photography techniques it can accommodate, such as ALS and UV or IR light). Cameras that can accommodate several modes and light sources are typically more expensive, especially when they are created specifically for ease of use in a clinical setting (e.g., integrated camera systems). Although some cameras, like point-and-shoot cameras, are easy to operate, they lack versatility. Beyond camera procurement, decision-makers may also consider the upfront investment of training and additional accessories needed to successfully operate these cameras.

[a] Note that integrated camera systems and colposcopes are created specifically for clinical applications.

Photography Techniques for Sexual Assault Medical Forensic Examinations



		Ultraviolet Light (UV-A)	Visible Light	Alternate Light Source	Infrared Light (IR-A)
Wavelength Range		320-400 nm	400-700 nm	Specific Ranges Within 400-700 nm	700-1,400 nm
Technique is good for...		• Visualizing surface injuries (e.g., cuts, bite marks) when bruising obscures detail • Detecting aged bruises	• General documentation purposes (e.g., full body, mid-range, and close-up photographs)	• Visualizing the extent of bruising not apparent to unaided eye • Observing injuries on darker pigmented skin • Visualizing trace evidence and biological fluids	• Visualizing deep bruises • Viewing biological fluids or trace evidence against a dark or patterned background
Options with Manually Adjustable and Automated Parameters	DSLR Camera	No	Yes	Yes, with barrier filter and ALS	No
	Mirrorless Camera	Yes, with barrier filter and UV light source	Yes	Yes, with barrier filter and ALS	Yes, with barrier filter and IR light source
	Converted Camera	Yes, if full spectrum conversion, with barrier filter and UV light source	Yes, if full spectrum conversion, with external hot mirror	No	Yes, if full spectrum or IR conversion, with barrier filter and IR light source
Options with Pre-configured Parameters	Integrated Camera System*	Some systems	Yes	Some systems	Some systems
	Colposcope*	No	Yes	Yes, with digital filter	No
	P&S Camera	No	Yes	No	No

*designed specifically for clinical applications

Exhibit 6. Forensic photography techniques for documenting SAMFEs.

Options with manually adjustable and automated parameters

Each camera option profiled in this report allows the SANE to capture photographs in "**automatic mode**," where the camera chooses parameters appropriate for the subject being photographed. However, options such as **DSLRs**, **mirrorless cameras**, and **converted cameras**, can operate in "**manual mode**," where the SANE can choose and adjust parameters to fit their needs. These parameters may be useful when obtaining a true and accurate representation of

evidence in technically complex situations (e.g., capturing ALS photography).[b] These adjustable parameters, commonly referred to as the "exposure triangle," include the following:

- **Aperture:** Aperture refers to the diameter of the lens opening, expressed as "f-stops," which controls how much light reaches a camera's sensor. A lower f-stop sets a larger aperture opening and decreases the depth of field causing a blurred background.[25]
- **ISO:** ISO refers to the sensitivity of an imaging sensor to light, and is represented by a numerical value.[25] Higher ISO can increase the brightness of a photograph, which may be helpful in a dark room but may result in grainy, low-quality photograph resolution.
- **Shutter Speed:** Shutter speed is the length of time a camera's shutter remains open as a photograph is taken. Quick shutter speeds let less light through and may cause the photograph to be dark, but long shutter speeds may produce a blurry photograph.[25]

Changing the parameters that make up the exposure triangle allows the SANE to vary the image exposure, which determines the lightness or darkness of a resulting photograph. Adjusting exposure can be helpful when working with differences in patient skin pigmentation. Though it may sound counterintuitive, SANEs may better visualize injuries on individuals with darker skin pigmentation by decreasing the camera aperture, thus avoiding overexposure.[26] Manual adjustments are helpful with alternative photography techniques like ALS, UV, and IR, where the SANE must capture photographs in a darkened room with the tuned light source as the sole source of light. Although no known nationally available SANE guidelines or protocols recommend completing photography specifically using manual mode, best practice guides related to other forensic photography applications, such as crime scene photography, recommend procurement of a camera capable of manual mode, such as a DSLR.[27] Although manual cameras are more versatile, there is a high learning curve associated with their use, and each parameter setting has trade-offs. In addition to manual mode, DSLR and mirrorless cameras offer "intermediary" modes that enable the user to set one parameter while the camera adjusts the other parameters accordingly. These intermediary modes allow the user to familiarize themselves with how aperture, ISO, and shutter speed might affect the outcome of a photograph. Intermediary mode options include the following:

- **AV mode:** The desired aperture is chosen, and the camera will adjust the ISO and shutter speed based on the camera's light meter.[28]
- **TV/S mode:** The desired shutter speed is selected, and the camera will adjust the ISO and aperture based on the camera's light meter.[28]

Most of these camera options offer a liquid crystal display screen that provides the following capabilities:

- Zoom features to view the quality of minute details after image capture.
- Adjustable focus points on a large display screen to ensure the subject is in focus prior to image capture.
- Numerical representations of the parameters in use (e.g., ISO, f-stops).

[b] Parameters for capturing a true and accurate representation of evidence may vary on a case-by-case basis. SANEs should consult policies and forensic photography training guides on the most appropriate parameters for their needs. This document does not recommend parameters for different photography circumstances.

DSLR Cameras

The Scientific Working Group on Digital Evidence recommends using a DSLR camera for crime scene photography; DSLR cameras are widely used across other applications in the forensic community.[29] Additionally, DSLR cameras have been used in injury documentation studies. For example, Scafide *et al.* used a Canon T6i DSLR (with a 50 mm fixed lens [f/2.2] and ISO 400) to document bruises on varying skin tones using visible light with a yellow filter and blue light source.[15]

The DSLR camera can accommodate many types of lenses, and the user can attach barrier lens filters for ALS photography. However, these cameras are unable to document UV or IR light because of a UV/IR cut (also referred to as a "hot mirror") installed in front of the camera's sensor, which blocks light outside of the visible light spectrum from reaching the camera's sensor.

DSLR Cameras	
Benefits	▪ Flexibility to photograph in many modes ▪ Built-in viewfinder allows for real-time visualization ▪ Ability to accommodate visible light (including ALS with the appropriate barrier filters)
Considerations for use	▪ Newer models of cameras possess a live view feature, but older models may not ▪ Cannot capture UV and IR photography ▪ Additional cost for zoom lenses ▪ Technology may become obsolete with the advent of mirrorless cameras
Typical price	▪ Depending on the age and specifications of the camera, prices may range from $600 to $3,000 ▪ Lenses may cost around $1,200
Examples of cameras on market	▪ Nikon D Series (e.g., D500, D7500) ▪ Canon EOS Series (e.g., Rebel T6i)

DSLR camera technology has evolved significantly since it became available approximately 20 years ago. Newer models offer a live view feature, which allows the user to preview the impact of changing the camera's parameters (e.g., aperture, shutter speed, ISO) on the image before taking the photograph. However, DSLR technology is beginning to phase out in place of mirrorless cameras: both Sony and Canon have ended their long-running lines of DSLR cameras in favor of mirrorless products.[30] As the industry shifts toward mirrorless cameras, accessories and technical support for these products may diminish.

Mirrorless Cameras

Although the image quality captured by modern DSLR and mirrorless cameras is generally equivalent, the main difference between these camera types is the absence of a hot mirror in the camera body. While DSLR technology relies on a mirror to bounce light into the camera's viewfinder, mirrorless cameras lack this mirror, allowing light to pass to the camera sensor directly. Mirrorless cameras possess a live view feature that enables the user to view the image through an electronic viewfinder.[31]

Mirrorless cameras offer advantages over DSLRs in that they:

Mirrorless Cameras	
Benefits	▪ Ability to accommodate visible light (including ALS) and UV/IR light with the appropriate barrier filters ▪ Flexibility to photograph in many modes ▪ Typically smaller and lighter than DSLR cameras
Considerations for use	▪ Battery life may be shorter than that of DSLR cameras (though this may depend on the model) ▪ Lens adapters can allow lenses from DSLRs to be used, lowering the cost of implementation
Typical price	▪ Prices may range from $1,000 to $5,000 ▪ Lenses may cost around $1,200
Examples of cameras on market	▪ Nikon Z Series ▪ Canon EOS RP ▪ Fujifilm X-T200 ▪ Sony A6100

- Enable UV and IR photography when used with appropriate barrier filters and light sources, in addition to visible light photography.
- Tend to be smaller and lighter with fewer inner mechanisms, reducing strain on the user.
- Offer enhanced image stabilization, as they lack an internal mirror that may vibrate when taking photographs.[31]
- Are capable of manual, automatic, and other modes, but some literature has identified challenges with manual mode focusing and use in low light.[32]

Mirrorless cameras have a shorter battery life than DSLRs because of the power usage of the electronic viewfinder. Lens adapters allow the use of DSLR lenses on mirrorless cameras, saving organizations money when switching technologies. Mirrorless cameras are relatively new to the consumer market, so there are fewer accessories available than those available for DSLR cameras;[33] furthermore, the FTCOE did not identify any studies on injury documentation using mirrorless cameras.

Converted Cameras

Converted cameras are conventional cameras that have been modified to accommodate UV or IR photography techniques. Depending on the size of the organization, purchasing an integrated system to enable UV/IR photography may not be financially feasible. Camera conversion is a more convenient and affordable alternative, because organizations can leverage previously owned or older equipment that is already in their inventory. While typically only DSLRs undergo conversion, point-and-shoot cameras (discussed below) can be converted as well. To use both UV and IR photography, an organization may purchase a converted camera or can submit a camera for full-spectrum conversion to third-party providers such as Kolari Vision and Spencer's Camera. Full-spectrum conversion replaces the camera's internal hot mirror with a clear glass filter, so that a full spectrum of light (i.e., IR, visible, and UV light) can reach the sensor (see ***Exhibit 7*** for a schematic on how these cameras are converted to enable full-spectrum photography). Additional barrier filters and light sources are needed to take proper photographs in UV or IR wavelengths. After conversion, the camera can still be used for conventional photography if a hot mirror internal filter is reinstalled by the vendor or if the SANE uses an **external hot mirror** on the camera lens.

Converted Cameras	
Benefits	▪ Depending on the conversion, allows users to capture UV, visible, and IR light photography ▪ Can use point-and-shoot or DSLR cameras already in an organization's inventory ▪ Less expensive than buying an integrated camera system
Considerations for use	▪ Typically these cameras are no longer capable of ALS photography ▪ Use requires additional appropriate light sources or barrier filters ▪ Training is recommended because they can be difficult to use, especially if the camera does not offer live view capabilities ▪ For full-spectrum conversions with the intent of using UV photography, the camera lens should not have anti-UV coating
Typical price	▪ DSLR conversion: $275 to $600 ▪ Point-and-shoot conversion: $90 to $200
Examples of companies that convert cameras	▪ Kolari Vision ▪ Spencer's Camera ▪ LifePixel ▪ MaxMax
IR enabled converted cameras available	▪ Fujifilm X-T1 IR has been discontinued but may be available second-hand

To enable IR photography only, the internal hot mirror or clear glass filter (if previously converted to enable full-spectrum photography) of the camera is replaced with a filter that allows only IR light to pass to the camera's sensor.

With an internal filter that blocks out visible light and UV light, no external barrier lens filter is needed, but an external IR light source is still recommended.

The lenses embedded during the conversion may obscure the user's view, which can complicate the ability to focus on the subject; however, this can be mitigated by training. DSLR cameras with live view capabilities are optimal for conversion given the ability to preview the image prior to photograph capture.

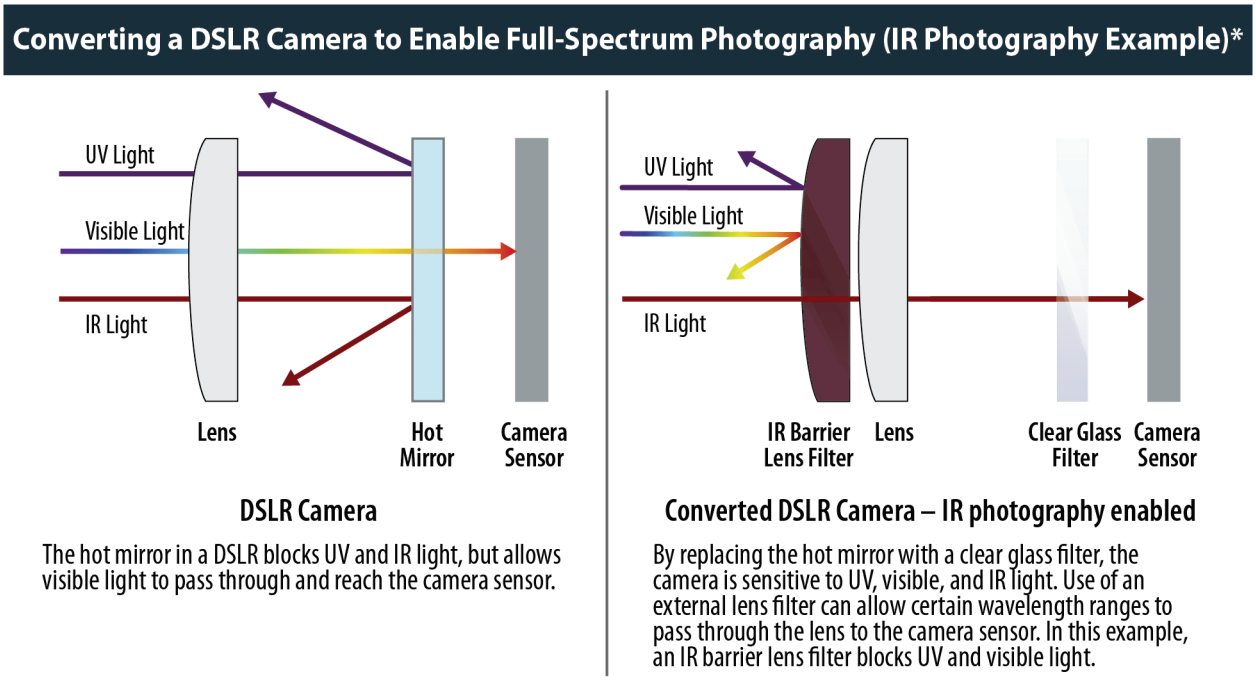


Exhibit 7. Converting a DSLR camera to enable full-spectrum photography requires replacing the internal hot mirror with a clear glass filter, allowing UV and IR light to pass through to the sensor, along with visible light. *For this example, the camera possesses an appropriate barrier lens filter that allows IR light to reach the camera's sensor and be photographed while filtering out both UV and visible light.*

Options with pre-configured parameters

Organizations looking to implement cameras that are simpler to operate may consider products that automate most parameters, balancing flexibility with ease of use. While camera settings are pre-configured, these tools allow the user to adjust elements such as (1) the zoom, (2) the intensity of the light source illuminating the subject, and (3) in some cases, the point of focus. SANEs may rely on products made specifically for clinical documentation such as integrated camera systems and colposcopes that offer features designed for SAMFEs. These products are often more expensive than DSLR or mirrorless cameras. Alternatively, point-and-shoot cameras are the simplest and the least expensive camera with pre-configured parameters available.

Although the use of a digital camera is preferred for obtaining forensic-quality photographs, some SANEs may rely on single lens reflex cameras.

A single lens reflex (SLR) camera is a film camera that uses a reflex mirror (or prism) that reflects light into the optical viewfinder, allowing the SANE to capture the image they're seeing in front of them.[34] A precursor to the DSLR, the SLR allows the SANE to adjust parameters manually (e.g., shutter speed, aperture, focus functions), use various lens types to visualize fine details, and capture ALS photography using attachable barrier lens filters. Although SLR cameras possess no embedded flash, an external flash can be used. SLR cameras offer good image quality, color contrast, and dynamic range but can only take a limited number of photographs because they store captured images on film rather than a memory card. Additionally, film requires time to be developed, and appropriate storage as long-term exposure to moisture or high temperatures can degrade the quality. The FTCOE does not recommend the use of SLR cameras for photo documentation of a SAMFE because storing photographs on printed film introduces the potential for degradation and loss of evidentiary records. If SLR cameras are used and the resulting photographs are printed, these photographs (and the associated negatives) should be stored in a secured manner that prevents exposure to environmental factors (e.g., UV, heat, moisture). In addition, the use of a digital scanner to produce a digital copy of the photographs may add an additional safeguard. Consult your organization's policies for specific storage considerations.

Integrated Camera Systems

Integrated camera systems are created specifically for documenting evidence in a clinical setting. Although these systems can vary in complexity, they typically consist of a digital camera outfitted with a zoom lens, a white ring light, and a tripod or other accessories that enable hands-free photography. As integrated systems, they offer an easy-to-use interface that helps the user efficiently take the photographs they need. The expense of these systems is typically comparable with or more expensive than their respective separate elements. When evaluating commercially available options for integrated systems, the decision-maker may consider the following:

Integrated Systems	
Benefits	▪ Created with SANE workflow and needs in mind ▪ Reduce the need to procure additional accessories ▪ May enable hands-free photography
Considerations for use	▪ Large variations between integrated systems allowing the decision-maker freedom to procure the system that is best suited to fit their needs ▪ Some systems may not capture the photograph in a raw format (i.e., format in which data are minimally processed) ▪ Systems are typically expensive
Typical price	▪ Prices can range from $3,000 to $24,000+ ▪ Some systems offer subscription services to store and send data through an electronic system
Examples of cameras on market	▪ Crime-lite AUTO ▪ Cortexflo ▪ SDFI Contrast Camera System ▪ CrimeCam Examiner+ ▪ ILLUMACAM-2 ▪ Mobile Multispectral Forensic Tablet

The integrated camera interface. Some camera systems, such as the Secure Digital Forensic Imaging (SDFI) Contrast Camera System, Cortexflo, and ILLUMACAM-2, consist of a modified DSLR that is pre-configured for SAMFE applications; although similar to DSLR options, these options are relatively simple to operate. Some systems, like the Crime-lite AUTO, offer a tablet-like interface to help SANEs visualize and capture evidence.

The types of photography it can enable. Many integrated cameras are configured for ALS, UV, and IR photography and offer the appropriate excitation light and barrier filters to visualize evidence, as shown in ***Exhibit 8***. Some integrated systems allow the SANE to apply an electronic filter to the photograph at the time of capture for comparison of the original and enhanced image in real time. The spectral range of the camera (visualization outside of visible light) and the wavelengths of light emitted by these systems may differ significantly. The Crime-lite AUTO, for example, emits 55 combinations of wavelengths across the UV, visible light, and IR spectrum, with a fluorescent filter option that automatically selects the barrier filter that helps visualize evidence at a specific wavelength. The SDFI Contrast Camera System, on the other hand, offers UV light but no visible light wavelengths. Beyond wavelengths of light, decision-makers may also consider zoom capabilities. Some systems can capture close-up images but are not able to capture full body photographs.

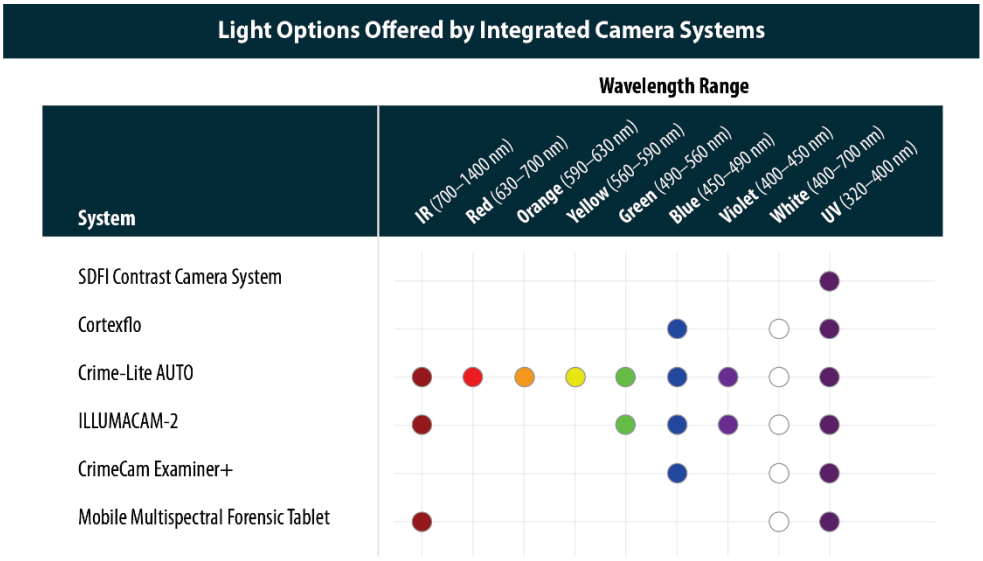


Exhibit 8. Integrated camera systems enable SANEs to photograph using visible light, white light, ALS, UV light, and IR light techniques. *These colors represent wavelength ranges as noted in Exhibit 1 and Exhibit 6. Please note that this exhibit may not capture all specific wavelengths emitted by the integrated system (e.g., Crime-lite AUTO's 55 wavelength combinations).*

The size of the system and its ease of use. Some systems, like the Crime-lite AUTO and the SDFI Contrast Camera System, can be used as a handheld instrument or anchored on a tripod to enable hands-free photography. Systems like the Cortexflo are much larger and are anchored by a swinging arm that enables flexibility and hands-free documentation.

Processing and storage capabilities. Many integrated systems offer a software component to process, store, or send captured photographs in a secure manner. For example, SDFI offers an annual SDFI File Portal subscription that encrypts photographs and allows for secure online transfer.

In summary, these systems are easy-to-use, simple tools that have significant versatility for photo documentation. Integrated systems often include accessories needed to capture forensic-quality photographs. As such, they are often more expensive than "à la carte" camera, lens, and barrier lens filter options.

Colposcope Cameras

Colposcopes are designed to photo-document internal genital observations but can also be used to document external injuries using filters or white light illumination. Some colposcope cameras, such as the Cooper Surgical Leisegang OptiK models, are modified DSLR cameras mounted on a swinging arm rolling base. Others, like the EVA SANE system and the Lutech LT-3000 HD Digital Video Colposcope, are compact handheld systems. Many options offer a green filter to highlight blood vessels through approaches such as (1) shining only green light on the area of interest, (2) using a green barrier lens filter, or (3) applying a digital filter to the photograph at the time of capture.

Colposcope Cameras	
Benefits	▪ Versatility to document internal and external injuries ▪ High-quality zoom capabilities to focus on minute details ▪ Created with SANE workflow and needs in mind ▪ May already be implemented in a clinical setting
Considerations for use	▪ Other than the green filter, cannot accommodate ALS, UV, or IR photography ▪ May not be able to capture full body or mid-range photographs ▪ Camera outputs may be more pixelated than traditional camera types
Typical price	▪ Prices may range from $6,750 to $16,000 (plus accessories and subscription fees for electronic server systems)
Examples of cameras on market	▪ EVA SANE ▪ Cooper Surgical Leisegang Optik models ▪ Lutech LT-300 HD Digital Video Colposcope

These cameras are designed for close-up internal photography and may not be able to capture high-quality full body or mid-range photographs. These options typically offer a lower resolution than modern DSLR or mirrorless cameras. Storage capabilities vary depending on the model, with some colposcope vendors offering data management software to securely store data in a clinical setting.

Point-and-Shoot Cameras

A point-and-shoot camera is the most rudimentary type of digital camera available. A point-and-shoot camera requires little knowledge of cameras and parameters such as shutter speed, aperture, ISO, and embedded flash, which are fully automated.[35] Although advances in technology have significantly improved the resolution and zoom capabilities of point-and-shoot cameras, these cameras are often discouraged for fine detail work for forensic photography or documenting evidence and other details.[29]

Point-and-Shoot Cameras	
Benefits	▪ Straightforward, pre-configured functions, and easy to operate ▪ Built-in accessories (e.g., embedded flash) ▪ May cost less than DSLR models
Considerations for use	▪ Limited versatility because of the fixed lens ▪ Ability to accommodate visible light photography only ▪ Zoom capabilities are limited, and some models may not have forensic-quality documentation capabilities
Typical price	▪ Prices may vary widely from $100 to $1,000+
Examples of cameras on market	▪ Canon PowerShot ▪ Nikon COOLPIX ▪ Sony Cyber-Shot

Point-and-shoot cameras are easy to use and are typically sold at a lower cost than other cameras, but they may have limited value. With no interchangeable lens, point-and-shoot cameras are unable to accommodate barrier lens filters for ALS photography.

There are few published studies of using a point-and-shoot camera for injury documentation. Bloemen *et al.* published a study in which a point-and-shoot camera was used to document injuries of geriatric emergency department patients, however, only 25 injuries out of the 131 injuries photographed could be assessed for their

characterization by physicians.[36] Though a point-and-shoot camera is easier to use and less expensive than other camera types, it has not been fully studied for its application for sexual assault injury documentation.

Accessories

Camera accessories help capture clear and accurate photographs of injuries. SANEs may benefit from using the following tools: tripods to support and stabilize handheld cameras to reduce blur and mount ALS units, which are often bulky; white ring lights and external flash units to provide proper lighting; macro lenses to capture high-quality minute details in closer range; and American Board of Forensic Odontology (ABFO) scales to document injury size. ABFO scales are available in white, black, and gray. Each color is optimal under various situations. For example, white scales are ideal when photographing darker pigmented skin, black scales are ideal when photographing less pigmented skin, and gray scales are ideal when using ALS.

Accessories	
Conventional photography	▪ Tripod ▪ White ring light ▪ External flash ▪ Macro lens ▪ ABFO scale

ALS/UV/IR	▪ Barrier lens filter
	  ○ UV: Wratten 18A, Peca 900
	  ○ IR: Wratten 87, Peca 904
	▪ Barrier goggles
	▪ A tuned light source at specific range of wavelengths
	▪ Lens adapter (depending on the camera used)

For photography techniques using ALS, UV light, and IR light, the following equipment is required:

- Barrier filters that help visualize and document evidence, including goggles for eyewear and filters that attach to the camera lens. When purchasing barrier lens filters, it is important to verify that the filters are the same size as the lens of the camera or that they can be adjusted through the use of a lens adapter.
- A tuned light source (e.g., from an ALS).
- For UV and IR photography techniques, a camera that is not limited to the visible light spectrum. This includes converted cameras or mirrorless cameras.

Camera vendors may not always offer this additional equipment; therefore, additional investments may be required for appropriate and effective use of the camera technology. Some vendors offer equipment bundles to facilitate the procurement process such as the following:

▪ Arrowhead Forensics CrimeCam Examiner+ bundle includes a DSLR camera, barrier filter goggles, barrier lens filters, ring light (with blue, UV, and white LEDs), diffuser ring, lens adapter cover, and an SD card.

▪ Fujifilm X-T1 IR Forensic bundle includes the X-T1 IR camera body, macro lens, IR barrier lens filters, shoe mount flash, forensic scale marker, and an SD card.

> **"When exploring alternative photography options, users might be unaware of the need for filters. Agencies should consider filter selection even if they are not included in kits."**
>
> *—King Brown, Crime Scene Investigator, West Palm Beach Police Department*

Considerations for Implementing Cameras for SAMFEs

SANEs may use one or more of the camera technologies discussed previously to effectively document evidence during a SAMFE. Organizations looking to purchase these camera options should consider the following:

Training requirements. Training is a necessary investment to ensure that equipment is used efficiently and that evidence is documented properly. Organizations looking to implement new photo documentation technology should consider the time and resources needed to train SANEs on the tools. SANEs should be supported to pursue training opportunities relevant to the specific techniques they will use (e.g., ALS) and ongoing education and opportunities that build confidence in using the techniques.

Organizations may leverage expertise from crime scene investigators and FSSPs to understand the needs of forensic-quality photo documentation, training opportunities, and camera options. These subject matter experts can share insights as well as offer example policies and best practices regarding photo documentation. For example, the common practice of refraining from deleting poor-quality photographs taken during an examination was referenced as standard practice during the FTCOE's interviews with SANEs.

Equipment that can enhance efficiency and usability. During a SAMFE, the SANE may be juggling a variety of items—lights, camera types, paper-based forms and diagrams—while interacting with the patient. Typically, SAMFEs are 4 to 6 hours long, and SANEs are working during this process to balance the patient's comfort with a high-quality comprehensive examination. Therefore, cameras and accessories that streamline documentation can be mutually beneficial. Helpful features include those listed here:

- **Hands-free documentation:** Tripods with the help of foot pedals and voice-activated camera systems enable the SANE to tend to the needs of patients and take photographs simultaneously.
- **Real-time picture review:** Using the live view feature on a camera or connecting the camera to a computer monitor by an HDMI cable allows SANEs to view an image and adjust prior to capture. Once captured, SANEs can quickly review the photograph on the camera display to ensure the image quality is appropriate and determine whether any additional photographs are needed.
- **Shadow-free documentation:** Ring lights around camera lenses can help capture detailed, shadow-free photographs.

Spatial constraints of the facility. SANEs often work in small rooms that lack space for large equipment and create challenges when capturing full body and mid-range photographs. Equipment that can take a wide range of photographs (i.e., full body and high-resolution close-up photographs) may help alleviate the spatial constraints of the room. Features such as tiltable screens can help SANEs preview images prior to capture when they are unable to be eye level with the camera. Equipment with large swinging arms, such as the Cortexflo, may not be appropriate for SANEs working in small areas or across multiple examination rooms or building units.

Equipment that can aid with trauma-informed and victim-centered photo documentation. SANEs may consider features or accessories that can foster a more comfortable environment to better support the patient during the SAMFE. For example, using a camera that allows shutter sounds to be silenced may avoid triggering survivors whose assault involved nonconsensual photography. Darkness can be another common trigger for survivors of sexual assault, and photographs should be taken as efficiently as possible if darkness is needed (e.g., when using ALS to visualize and photograph evidence emitting fluorescence). Alternatively, some integrated systems such as the Cortexflo are fitted with LED ring lights that function in rooms with dimmed lighting, thereby easing this concern.

Courtroom admissibility of photographs. Integrated injury documentation systems may offer an option to apply a digital filter onto photographs to enhance injuries; this filter can be selected by the SANE at the time of image capture. The SDFI Contrast Camera System and the EVA system provide a high-contrast filter that inverts the numeric color value on each pixel of a digital photograph. SANEs may consider how these digital filters may impact admissibility of

these photographs in court. Although digital photographs are now widely accepted as evidence, such photographs must present an accurate representation of what was observed. Currently, image inversion, brightness and contrast adjustment, and color balancing or color correction all fit under the Scientific Working Group on Imaging Technology's definition of "basic image enhancement," or a technique used to "improve the overall appearance of the image."[37] Localized changes, or changes made to only a specific portion of a photograph, may not be accepted in court.

"When presenting photographs in court, the following questions may be asked to establish a foundation for admission of a photograph into evidence:

- Do you recognize this photograph?
- How is it recognizable? Did you take this photograph? Were you present when another person took this photograph?
- On what date was this photograph taken?
- What technology was used to capture this subject?
- Did you follow a specific photography protocol?
  - There would also be additional questions asked about the protocol and whether this witness followed all steps in the protocol.
- Does this photograph truly and accurately represent the observations you made on that day?

If advanced photography technology (e.g., ALS, UV, IR) or digital enhancement was used, these additional questions may be asked:

- What technology was used for photograph enhancement?
- Was enhancement necessary? If so, why?
- Did this enhancement cause any disruption to the photograph that would alter what we are seeing?"

—Patricia (Patti) Powers, Attorney Advisor, AEquitas

SANEs should consider jurisdictional requirements and policies related to image enhancement, document the image enhancements appropriately, and ensure that the original photograph is available for review. Organizations should track access to this information via chain of custody and document enhancements applied to the photograph via an audit trail. These procedures (or features embedded into integrated systems) will allow the SANE to provide a documented history of changes made during electronic enhancement of the photograph to help secure evidence admissibility.

Consulting members of the SART, including prosecutors, prior to purchasing equipment, may help SANEs select appropriate technology that meets sufficient quality standards and safeguards for admissibility.

Storage and security needs of captured photographs. Photographs taken during the SAMFE must be stored in accordance with forensic evidence standards and organization-specific protocols. Although these requirements may be similar to clinical security and storage requirements (e.g., HIPAA), they are not equivalent. For example, EVA SANE offers a cloud-based storage option that is HIPAA compliant but may not be Criminal Justice Information Services compliant. Awareness of available storage and data transfer options for a camera, and whether they align with forensic evidence storage requirements, can help inform product procurement.

Interviews conducted by the FTCOE with SANEs showed differences in photograph storage practices. Several SANEs stated that photographs are stored on encrypted internal networks for a specified duration of time, depending on relevant statutes and organization-specific protocols. Other SANEs indicated their organization deletes electronic documentation once printed photographs are filed. Additionally, some indicated that photographs are kept separate from the remainder of the patient's medical record for privacy purposes and to ensure limited access to these electronic files. Photograph release protocols also vary depending on the organization, with some solely requiring release forms signed and authorized by the patient and others needing court orders. In some cases, non-genital photographs are automatically sent to law enforcement investigators. Ultimately, protocols delineating the storage and release of photographs depend on the organization's policies and applicable state statutes and regulations. When purchasing camera equipment, SANEs should consider engaging with their SART members to plan for and invest in tools and training that ensure secure storage and sharing of photographs that support survivors and the investigation and are compliant with an organization's policies and applicable state statutes and regulations.

There are several ways a healthcare facility may store and secure confidential photographic information.[9] Some examples include the following:

- A hospital network, where file backups occur automatically.
- A password-protected virtual drive.
- A separate locked file in a facility medical records department.
- A password-protected external hard drive (placed in a secure/locked location).

Conclusion

Photo documentation during SAMFEs plays a key role regardless of whether the patient presents apparent injuries, abnormal findings, or other forms of forensically relevant evidence. Photographs create a preservable, accurate representation of observations made by the SANE during the SAMFE. Evidence and injuries photographed during the examination may be directly related to the care and treatment of the patient, but photo documentation may also be used to support the investigative and prosecutorial process should the patient choose to engage with the criminal justice system. This guidance document has listed several key elements of photo documenting a SAMFE:

SANEs may use multiple photography techniques during a SAMFE. Beyond visible light photography, which has served as the benchmark for basic evidence documentation, SANEs may benefit from the use of ALS, UV light, or IR light photography as tools to help visualize evidence and injuries. Although each of these techniques offer potential advantages and drawbacks, they are meant to augment visualization by documenting evidence not visible by the unaided eye and are not meant to replace traditional photography. Furthermore, these techniques should not be used as diagnostic tools for injury classification and determination.

Multiple types of cameras enable these photography techniques. There are many digital cameras available that may meet the needs of SANEs. Cameras capable of manual parameter adjustments (e.g., DSLR, mirrorless, converted cameras) allow the SANE to adjust settings to fit the environment and subject needed to achieve high-quality photographs. Cameras with pre-configured parameters (such as point-and-shoot cameras and cameras designed for clinical use, such as colposcopes and integrated camera systems) remove the need for the SANE to be well-versed in the principles of camera parameters.

There are a variety of camera products and features that can be used during SAMFEs. Decision-makers should consider the components of product offerings to determine technology best suited to fit the needs of their

organization and SANEs, including technical and operational complexity, versatility capabilities, compatibility with various photographic techniques, spatial constraints, and storage and security of captured photographs.

Equipment education and training are critical to success. To allow for efficient and effective use of both photography techniques and camera technologies, decision-makers must invest to properly train SANEs in the use of the technology and provide access to trainings associated with emerging technologies. Pursuing training opportunities that emphasize the use of equipment while promoting trauma-informed and victim-centered care is advantageous for the organization and the patients it serves.

Implementing a camera requires additional technology and accessory investments. Decision-makers must consider the cost of the minimum camera equipment (i.e., a camera capable of manual parameter adjustment or pre-configured parameters), equipment necessary to enable a photography technique (e.g., UV light photography requires a UV light source, barrier lens filters, barrier filter goggles, and a camera that can accommodate a barrier lens filter), and accessories that promote victim-centered care and facilitate greater ease for SANEs (e.g., tripod mounts for ALS units) when determining what options fit their budget, resource availability, needs, and align with organization-specific practices and protocols. Furthermore, decision-makers and SANEs alike should be aware of the capabilities and limitations of the technologies and photographic techniques under consideration.

Photo documentation during a SAMFE is a critical component of evidence collection and injury documentation procedures, with best practice guidelines and protocols encouraging camera technology to align with victim-centered and trauma-informed practices. Regardless of the techniques or technologies used for photo documentation, the needs of the patient related to their treatment, healing, and comfort throughout the entirety of the SAMFE must be prioritized. This document identifies photography techniques, available camera technology, and how these may be leveraged during SAMFEs.

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Appendix A

Related National Guidelines and Training Protocols for SAMFEs and Photo Documentation

Best practice guidelines and protocols have been developed to ensure survivors' needs are properly addressed while promoting the response of allied criminal justice professionals. This information provides SANEs; SART members including victim advocates, law enforcement investigators, FSSPs, and prosecutors; and decision-makers valuable insight to considerations related to the overall SAMFE process. *This table is not exhaustive, and information contained within is not intended to supersede but instead augment local policies, procedures, and legislation.*

Guideline/Protocol	Description	Photo Documentation Focus
U.S. Department of Justice, Office on Violence Against Women, National Protocol for Sexual Assault Medical Forensic Examinations: Adults/Adolescents 2013[2]	▪ Presents tailored protocols for adult/adolescent survivors and serves to update the guidance provided in the 1st edition published in 2004 by recognizing the Violence Against Women Act of 2005. ▪ Emphasizes that the purpose of the SAMFE focuses on addressing the patient's health care needs and the collection of evidence through a victim-centric coordinated team response for potential use within the criminal justice system. ▪ Recommends that a medical professional with specialized education and training in sexual assault response provides medical care to patients and perform all aspects of the SAMFE, including photography.	▪ Details the types of photographs that should be taken (e.g., mid-range and close-up photographs), approaches to balance a patient's comfort and privacy needs during photography, and considerations for storage and security of captured photographs. ▪ Emphasizes the importance of the SANE's familiarity with the equipment and education on forensic photography. ▪ Recommends explaining the photography process to the patient prior to starting photography and answering any questions they may have. ▪ Suggests taking photographs prior to evidence collection. ▪ Offers suggestions on adequate exposure and lighting, which should be used when obtaining photographs to ensure they are "clear and accurate" representations of observations made and are as informative as possible. ▪ Suggests shutter speed and aperture should be used to control exposure rather than using a camera with automated parameters. ▪ Details that a macro lens and ring strobe flash offer high-quality photographs and provide the photographer flexibility during the examination. ▪ Discusses that full body photographs should be sensitive to the patient; if only using these photographs for identification purposes, the patient can be fully clothed or gowned. ▪ Discusses that mid-range photographs of each injury sustained as a result of the sexual assault are necessary to show the relative location on the patient's body.

Guideline/Protocol	Description	Photo Documentation Focus
U.S. Department of Justice, Office on Violence Against Women, National Protocol for Sexual Assault Medical Forensic Examinations: Adults/Adolescents 2013 *(continued)*		▪ Suggests obtaining close-up photographs of injuries to document fine details and higher resolution of the injury, with care taken to shield the uninvolved breast and genital areas when possible. ▪ Suggests that when taking photographs with a scale, a photograph with and without the scale should be taken to show that the scale is not obscuring a portion of the injury. Photographs should primarily be considered a part of the patient's medical records in which applicable federal, state, and local laws should be followed which may impact their storage. ▪ Recommends against be automatically transferring photographs to law enforcement without proper documentation. ▪ Suggests that consulting with SART members can provide additional insight as to what photography equipment may be best suited for use during SAMFEs.
U.S. Department of Justice, Office on Violence Against Women, A National Protocol for Sexual Abuse Medical Forensic Examinations: Pediatric[7]	▪ Presents tailored protocols for pediatric patients. ▪ Delineates the considerations for interacting with prepubescent children to address their health needs and promote healing while gathering evidence for subsequent investigations or child protection services. ▪ Fosters a community response to improve protocol recommendations that embed victim-centered and trauma-informed approaches.	▪ Suggests DSLR cameras should have at least 12 pixels for forensic purposes. ▪ Suggests linking photographs should be able to be linked back to the patient for identification. ▪ Suggests taking at least three shots at different ranges: one overview, one medium-range, and one close-up. ▪ Recommends consulting with local criminal justice agencies when determining the type of photographic equipment that should be used.
U.S. Department of Justice, Office on Violence Against Women, The National Training Standards for Sexual Assault Medical Forensic Examiners 2018[38]	▪ Outlines a didactic and clinical training framework recommended for SANE education and training. ▪ Emphasizes a didactic training framework that should include an overview of sexual violence; practice considerations; victim response and crisis intervention; collaboration with SART members; history-taking; physical examination; evidentiary specimen collection; photography; STDs; pregnancy; risk, evaluation, and care; documentation; discharge and follow-up; and legal considerations and testimony. ▪ Delineates key concepts for each topic area presented above.	▪ Discusses that training standards related to photography include knowledge of informed consent, equipment, techniques to document injuries, quality and integrity of the photographs, communicating the importance of photography, and legal considerations. ▪ States that photographic equipment should be used that can clearly document the level of injury.

Guideline/Protocol	Description	Photo Documentation Focus
International Association of Forensic Nurses, Sexual Assault Nurse Examiner (SANE) Education Guidelines 2018[39]	▪ Identifies the minimum knowledge needed for conducting a SAMFE, summarizes the function of a SART, and collective issues related to the practice of SANEs. ▪ Recommends the SANE uses "nursing process and applies established evidence-based standards of forensic nursing practice to ensure that all patients reporting sexual violence and victimization receive a competent medical forensic examination. " ▪ Promotes a trauma-informed approach regardless of patient behavior. ▪ Identifies knowledge, skills, and abilities needed to "provide competent, comprehensive, patient-centered, coordinated care to patients being evaluated for sexual assault, or suspected of having been sexually assaulted." ▪ Delineates the competencies needed for SANEs to accurately and objectively document physical and evidentiary findings in adult and adolescent sexual assault patient populations using medicolegal photography.	▪ States that SANEs should accurately identify physical findings that warrant medicolegal photographic documentation. ▪ States that SANES accurately identify biologic or trace evidentiary findings that warrant medicolegal photographic documentation. ▪ Suggests collecting and analyzing data regarding the physiological, psychological, sociocultural, and spiritual needs of patients following sexual assault that warrant medicolegal photography. ▪ Outlines different options for obtaining medicolegal photographs to include colposcopes, 35mm cameras, and digital equipment. ▪ Identifies how select variables affect the clarity of medicolegal photographic images, including skin color, type and location of findings, lighting, aperture, and film speed. ▪ Discusses key medicolegal photography principles, including obtaining images that are a relevant, true, and accurate representation of the subject matter and are noninflammatory in nature. ▪ Distinguishes photographs obtained by the examiner as part of the medical/health record. ▪ Identifies medicolegal photography principles as they relate to the types of images required by judicial proceedings, including overall, orientation, close-up, and close-up with scale photographs. ▪ Prioritizes medicolegal photography needs based on assessment data and patient-centered goals. ▪ Adapts medicolegal photography needs based on patient tolerance. ▪ Suggest appropriately selecting the correct media for obtaining medicolegal photographs based on the type of physical or evidentiary finding warranting photographic documentation. ▪ Identifies situations that may warrant follow-up medicolegal photographs and discuss options for securing captured photographs. ▪ Recognizes the need for consistent peer review of photographs to ensure quality and accurate interpretation of photographic findings.

Guideline/Protocol	Description	Photo Documentation Focus
U.S. Department of Justice, Office for Victims of Crime, SANE Program Development and Operation Guide[10]	▪ Provides information related to developing, growing, and enhancing a SANE program. ▪ Serves to accompany existing guides and protocols and organization-specific protocols, regulations, and overarching legislation.	▪ States that photographic images must be securely stored. ▪ States that SANE programs need to have protocols and procedures in place for the release of photographs.
"Best Practice Forensic Photo-Documentation: Show Me the Injuries!"[9]	▪ Identifies basic photography skills that SANEs should consider for SAMFEs and beyond.	▪ Highlights the value of forensic documentation via photography, patient-provided consent, steps taken in a comprehensive anogenital photo documentation process, and considerations for storage of obtained photographs.
"Photo Documentation and the Medical-Forensic Examination: If There is No Picture, Was There Really Injury?"[40]	▪ Emphasizes that photographic documentation is invaluable as evidence. ▪ Includes information regarding the impact of equipment, protocols, guidelines, and training on the accuracy of photographs showing a standard of forensic care. ▪ Emphasizes that the key to excellent practice is proper and complete documentation.	▪ Provides 12 reasons for using a camera to address the healthcare needs of the patient. ▪ Warns of the consequences of deleting photographs. ▪ Suggests an outline of steps that should be taken by SANEs during the anogenital photo documentation process.
Academy of Forensic Nursing, Anogenital Photo Documentation Guidelines 2021[41]	▪ Promotes the development of skills for "effective evaluation, evidence collection, and forensic documentation" for a SAMFE. ▪ Emphasizes the importance of obtaining consent prior to beginning the SAMFE.	▪ Suggests a DSLR as the means to capture forensic-quality photographs. ▪ Provides troubleshooting steps to be taken during anogenital documentation. ▪ Highlights the rule of thirds.

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Additional Resources

For more information and guidance on SAMFE photo documentation, please reference the following:

- Photo Documentation and Sample Digital Photography Policy — A policy from the *Illinois Sexual Assault Medical Forensic Services Implementation Task Force* that outlines specific photo documentation considerations and provides an example policy template.
- Photography in Sexual Assault Care — A webinar provided by SAFEta that discusses photography recommendations presented in the *National Protocol for Sexual Assault Medical Forensic Examinations: Adult/Adolescent 2nd Ed.* and the *National Protocol for Sexual Abuse Medical Forensic Examinations: Pediatric*.
- IAFN Medical Forensic Examination Videos — Videos provided by the International Association of Forensic Nurses (IAFN) discussing the overall SAMFE and coupled photography recommendations.
- SAFEta Examination Process Photography — This article outlines photography recommendations for SANEs to consider throughout the SAMFE.
- ANE-SANE Grant Program Registration Information — This website shows one of the many programs funded by Health Resources & Services Administration (HRSA) to promote free education and training for future SANEs.
- SAFE-T System — This website showcases the SAFE-T System, operated by Pennsylvania State University, which provides SANE expert guidance to local partner hospitals through telehealth systems.
- IAFN-Approved SANE Courses — A list of IAFN-approved SANE training courses/programs that meet current SANE education guidelines.
- Test Pattern — Sponsored by the Academy of Forensic Nursing and Leda, black, indigenous, and people of color nurses are eligible to apply for free SANE training.
- Domestic Violence Photography — This article outlines the basic photography knowledge using an SLR camera and details how to document injuries using UV photography.

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