Chapter 7
Scene Investigation in Juvenile Death

Bobbi Jo O'Neal and Jennifer Schindell

Abstract The primary goal of a scene investigation is to identify, protect, document, and collect potential evidence that may provide information regarding the circumstances of the death. The scene investigation can provide valuable information regarding the identity of the deceased, postmortem interval, cause of death, manner of death, and may provide information about persons who may have contributed to the death. This chapter reviews basic scene investigation procedures as well as their application in child death investigations.

7.1 Introduction

While this chapter will focus on cases where abuse or neglect has led to death of a juvenile, the tenets set forth may be readily applied to scene investigations involving living children. Discovery of child abuse, neglect, or death often occurs some time after the original event(s) and in a location away from the original scene.

For a number of reasons, it is relatively uncommon that a deceased child is found and examined at the scene of the original event. Discovery of a critically ill or injured child will cause most people to seek immediate medical assistance, and as a result, child death investigations often begin in a medical facility. To further complicate matters, when a child dies as a result of abuse or neglect, the offender(s) may seek medical care yet provide a false or misleading history. The offender(s) may also wait until the child is "discovered" by someone else or hide/dispose of the body. Each of these situations presents unique scene investigation challenges that will be discussed in this chapter.

The scene investigation provides important information when attempting to determine, explain, and understand the circumstances of any death. The scene investigation helps answer the question "What happened?" and, just as importantly, "What didn't happen?" Other sources of information gathered during a child death investigation include terminal circumstances; medical history; social history; witness interviews and statements; initial external physical examination of the body;

B.J. O'Neal (✉)
Charleston County Coroner's Office, North Charleston, SC 29405, USA
e-mail: boneal@charlestoncounty.org

A.H. Ross, S.M. Abel (eds.), *The Juvenile Skeleton in Forensic Abuse Investigations*,
DOI 10.1007/978-1-61779-255-7_7,

autopsy findings to include radiology, toxicology, and other specialized laboratory testing; and doll reenactments as indicated. Many questions surrounding the circumstances of a death are answered by combining and comparing information from a number of these sources.

A prompt and thorough scene investigation is fundamental to an accurate cause and manner of death determination and increases the likelihood that the innocent may be exonerated and the guilty may be held accountable. In cases where the child is a victim of noncriminal, but preventable death, information gathered at the scene may impact statistics, which in turn will impact funding, education, and research directed toward the prevention of similar deaths [1].

7.2 Goals of the Scene Investigation

The primary goal of any death investigation is to determine "cause" and "manner" of death. Cause of death is the underlying disease or injury progression that results in death. Examples of cause of death determinations include "Gunshot Wound of Head," "Viral Myocarditis," "Asphyxia by Drowning," or "Subdural Hematoma (due to) Blunt Force Trauma (due to) Fall from Height." Manner of death will generally be classified in one of the following categories:

NATURAL: due exclusively to natural disease
ACCIDENT: the result of an outside action not intended to cause death
SUICIDE: caused by acts of the decedent with the intent to end life
HOMICIDE: death at the hand of another person [2]

If an investigation is lacking sufficient evidence or information, it may not be possible for the manner of death to be identified. In those circumstances the death may be classified as an "undetermined" manner until the time that evidence or information is obtained to accurately classify the death.

Contrary to popular belief, few cause and manner of death determinations can be made from autopsy findings alone [2]. Scene findings are essential to understanding how and why an individual died. Even when the cause of death is readily apparent, i.e., gunshot wound to the head, the scene findings may clarify whether the injury was a result of homicide, suicide, or accident. Accurate manner of death determination requires understanding of circumstances surrounding the event. The scene investigation provides this critical contextual information.

The primary goal of a scene investigation is to identify, protect, document, and collect potential evidence that may provide information regarding the circumstances of the death. The scene investigation provides valuable information regarding the identity of the deceased, the postmortem interval, the cause of death, and the manner of death, and may provide evidence and information about persons who may have contributed to the death. Information and evidence gathered at a scene

of a death investigation may be further analyzed for identification, comparison, and individualization.

Child death investigation may involve many scenes such as the location where the decedent was initially injured, the location where they later died, and/or any place where the body may have been placed or kept after death. The primary residence should be examined, regardless of where the body is eventually found. The child's primary residence may provide much information regarding the child's normal activities of daily living, which in turn will provide valuable information about the child's normal and abnormal routines. These findings may be important for the cause and/or manner of death determination.

7.3 Impact of Growth and Development

Growth and development is an important consideration in any child death investigation. The investigator must correlate a child's actual abilities with events reported by caregivers and must maintain awareness of possible risk factors during different stages of development.

"Neonates" are infants between the ages of 1 day and 1 month. These children are at the greatest risk of accidental suffocation while bed-sharing with adults because they lack the ability to move out of a position that compromises their breathing. Two-year-olds may be more prone to an accidental drowning than a younger child as they are able to transport themselves to hazardous locations when not monitored. An 8-year-old child may be more prone to a bicycle or ATV accident, while a pre-teen or teen may be more prone to a drug overdose or motor vehicle collision based on their individual risk-taking behavior. Each stage of development has unique characteristics that may place those children at risk for certain types of injury/death. The scene investigation is an important tool to help determine the child's stage of development and/or determine circumstances that may have contributed to the death.

7.4 SUID/SIDS: What's the Difference?

In 1992, the US Senate and House of Representatives made a recommendation that a standard death scene protocol be developed for Sudden Unexplained Infant Deaths (SUIDs). Research suggested that data collected during infant death investigations were inconsistent across the county and that the manner in which these deaths were being classified on death certificates was also inconsistent [3, 4]. The classification of infant deaths is an important aspect to child death investigations and to the prevention of infant deaths. Lack of uniformity makes it difficult to monitor and identify infant death trends, which then alter statistics that ultimately impact research and prevention programs. It is important that professionals who classify or certify the cause of infant death use standardized criteria.

Often the terms Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS) are used interchangeably; however, they are two distinct terms that should be used with care. The SUID classification is a larger umbrella classification that includes all infant deaths with no obvious cause at the time of the infant's death [5]. The SUID category may include such causes of death as suffocation, neglect, choking, and SIDS, to name a few.

SIDS has been defined as the "death of an infant under 1 year of age that remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and a review of the clinical history." [6, 7]. In order for an infant death to be properly classified as SIDS, all of the above criteria must be met. If the autopsy, death scene investigation, or review of clinical history reveals any information that may offer a potential cause of death, then the term SIDS should not be used. In those cases the death should remain classified as a SUID with conditions that may have contributed to the death listed as a possible contributing factor to that death. Conditions that may contribute to a death with no obvious physical findings often include unsafe bed-sharing practices and inappropriate bedding. Placing infants to sleep in a prone position on unsafe bedding, can result in accidental asphyxia [8] (Fig. 7.1).

Fig. 7.1 Dangerous bedding conditions that contributed to the accidental asphyxial death of an infant

7.5 Doll Reenactments

Doll reenactments are an important scene investigation tool first mentioned in the 1996 Guidelines for the Death Scene Investigation of Sudden, Unexplained Infant Deaths and Investigative Report Form (SUIDIRF) developed by the Centers for Disease Control and Prevention (CDC). In 2006, the CDC released the Sudden, Unexplained Infant Death Investigation (SUIDI) Reporting Form [5] and associated training material that placed more emphasis on doll reenactments. The use of reenactment during the investigation of the death of a juvenile provides investigators with significant information that they may not be able to be obtained by other methods. Although it is beyond the scope of this text to provide detailed information regarding the use of doll reenactments, this very valuable technique should not go without mentioning.

Doll reenactments are a remarkably effective way for caregivers and witnesses to provide additional information regarding the circumstances of the event. The reenactment also provides investigators an opportunity to elicit information about how the infant was handled prior to and after the death (i.e., shaking, CPR demonstration, position placed in a crib, etc). This demonstration method should be used as a supplement to information described verbally or in a written statement [1].

7.6 Evidence Basics

The investigation of any death scene is driven by an attempt to identify and locate potential evidence. Specific types of evidence vary greatly between child death types and locations, but general concepts and procedures can be applied to all death scenes.

7.6.1 What Is Evidence?

> Evidence is "... anything that tends to logically prove or disprove a fact at issue in a judicial case or controversy" [9].
> Evidence is "... information ... that is given in a legal investigation, to make a fact or proposition more or less likely" [10].

There are many types of evidence and infinite methods for categorizing it. Regardless of how the evidence is categorized, the role of the scene investigator is to identify potential evidence; protect the integrity of that evidence from being altered or destroyed; document its existence, location, and context; and finally to collect the evidence in such a manner that the integrity and chain of custody are maintained.

7.6.1.1 Physical/Real Evidence

Physical or real evidence are tangible, material objects or items. Examples are weapons, soiled linens, sleeping surfaces, clothing, etc. Physical evidence has the

potential to provide valuable information regarding abuse or neglect of a child, to include the following:

1. Information on corpus delicti (objective proof that a crime occurred)
2. Linkage of individuals to objects and scenes
3. Identification of suspects, witnesses, substances, and items involved
4. Proving or disproving witness statements
5. Possibility for reconstruction of events [11, 12]

7.6.1.2 Demonstrative/Illustrative Evidence

Demonstrative or illustrative evidence are representations of an item or location used when the original item/location cannot be collected, maintained, and secured for the remainder of an investigation. This type of evidence must fairly and accurately represent the real object at the time in question. Examples include photographs, x-rays, animation, maps, doll reenactments, etc.

7.6.1.3 Transient/Conditional Evidence

Transient or conditional evidence are temporary, easily altered, or expected to degrade or disappear with time. Examples of such evidence at a scene are ambient temperature, odors, heat from an engine, standing water in a bathtub, etc. Examples on a body are rigor mortis (stiffening of the muscles), livor mortis patterns (blood settling in dependent areas of the body), and algor mortis (body temperature).

7.6.1.4 Trace Evidence

Trace evidence are smaller pieces or quantities of evidence that may be overlooked or misplaced without deliberate attempts to locate and protect them. Examples are hair, fibers, dried saliva, etc.

7.6.2 Locard's Exchange Principle

Locard's Exchange Principle (also known as Locard's Theory of Exchange) refers to the concept that information is exchanged every time two things come into contact. Although some transfers may be undetected, the idea that every contact leaves a trace should direct decisions and actions during scene investigation. Not only does this theory apply to the recognition and identification of potential evidence, but it also logically extends to concerns regarding possible scene contamination.

Scene investigators must try to minimize their impact on a scene by avoiding unwanted or unnecessary transfer into the scene. Investigators, first responders, and bystanders may inadvertently alter and contaminate that scene as every individual

who enters a scene risks leaving footprints, fingerprints, DNA, or other unintended transfer. The greater the number of people who have access to a scene, the greater the risk that the scene will be contaminated. Additionally, as more people move within a scene, there is greater risk that evidence of minute transfers may be obscured or lost.

> Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him. Not only his fingerprints or his footprints, but his hair, the fibers from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects. All of these and more, bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong, it cannot perjure itself, it cannot be wholly absent. Only human failure to find it, study and understand it, can diminish its value. Paul Kirk, 1953 [12]

7.6.3 Chain of Custody

For physical evidence to retain value from the scene to the courtroom, a "chain of custody" must be initiated and maintained. The chain of custody is a chronological record of individuals who have had physical possession of each item of evidence. A proper chain of custody offers documented proof that the evidence presented in court is the same as that collected at the crime scene. It maintains integrity of the evidence by recording who had contact with the evidence, when the contact was made, and what changes may have been made to the evidence. It is best if "links" on a chain of custody are kept to a minimum. The fewer the number of people who handle a piece of evidence, the fewer the questions that may arise about its integrity.

Chain of custody begins once evidence is recognized and collected. If a child is transported to a hospital, there may be a delay in recognizing and collecting evidence present on the body. Clothing, diapers, and other items may be removed by medical providers and unwittingly discarded without documentation. Medical staff may inadvertently return personal effects and/or other items over to family not recognizing their evidentiary value. It is critical to identify individuals who may have removed, altered, or discarded items brought in with the child. Those items must then be identified and, whenever possible, retrieved.

7.6.4 Specimen Collection and Storage

In order for evidence to retain its integrity, scene investigators must use appropriate techniques and equipment for collection, transport, and storage. Proper handling will increase the likelihood that useful information is obtained and ensure that the information will be admissible in a court of law.

Evidence packaging methods vary greatly between types of evidence, the condition of the evidence, and the type of analysis that may be requested on that evidence. Therefore, it is recommended that local crime scene procedure manuals be consulted

for the techniques most likely to protect the integrity of a specific type of evidence. As a general rule:

- Paper bags should be used for biological evidence such as blood-soaked clothing or skeletal remains. Whenever possible, items should be dried thoroughly, using proper procedures, before packaging for storage or transport.
- Paper envelopes or druggist folds/bindles may be used to hold trace samples such as hairs, fibers, and paint chips.
- Cardboard boxes may be used for larger items or items with sharp edges such as guns, knives, and sections of glass.

7.6.5 Personal Protective Equipment (PPE)

Because every contact at a scene may leave trace evidence, appropriate protective gear must be worn to protect against contamination. The scene needs protection from contamination by the investigator, and the investigator needs protection from potential biohazards at the scene. Gloves must be worn at all scenes, and booties and masks may be appropriate in certain circumstances. Protective equipment must be changed often, particularly when it has become pierced or soiled, or when handling new items of evidence. As discussed above, Locard's Theory applies to everyone and everything. Professional responders must be aware of the impact their mere presence in a scene may have on the potential evidence.

7.7 Roles and Legal Authority of Professionals Responding to Scene(s)

Prior to conducting an investigation of any potential scene, it is critical that those at a scene clearly understand their roles and legal authority. Investigation into the death of a child may result in a large interdisciplinary or even multi-agency response. An understanding of each other's roles will improve efficiency and efficacy, while an understanding of legal authority will protect the integrity of any information obtained during the investigation.

In order for evidence to be admissible in court, it must be legally obtained. Protection against unlawful search and seizure is granted by the Fourth Amendment to the US Constitution in the Bill of Rights. As a result, there are numerous situations in which a search warrant must be granted prior to initiating a search. In addition to the US Constitution, requirements for a warrant may be dependent on Supreme Court decisions, state law, and case law [13]. Local laws may also differentiate between the rights and responsibilities of law enforcement and coroners/medical examiners. There are situations in which a search warrant may not be

necessary, but if there is any chance that authority to search may be challenged, a search warrant should be obtained prior to entry.

Questions to answer prior to beginning any scene investigation:

- Who owns the property? Is the location private, public, or owned by the government? Do the investigating agencies have authority/permission to be present? Has consent been granted, or has a search warrant been executed?
- Is the scene safe to enter?
- Has the medical examiner/coroner been notified?
- Are other available resources being used appropriately?

7.8 Jurisdiction over Body and Scene(s)

Once the legal authority to be at the location has been established, jurisdiction over specific portions of the investigation must be determined. Each state/jurisdiction has its own laws, interpretations, duties, and relationships between law enforcement, medicolegal death investigators, and other agencies that may respond to a scene. In most cases, the body and/or human remains will fall under the jurisdiction of the coroner or medical examiner. Laws granting the coroner or medical examiner authority over the body may include items on the body, personal effects of the deceased, or implements that were involved in the act. Investigators are encouraged to review their individual state statutes. A team approach between law enforcement investigators and investigators representing the coroner or medical examiner's office is essential. A well-planned, collaborative approach will benefit all involved. The body and scene are inextricably linked, and a team approach provides for greater efficiency, more detailed investigation, and greater exchange of information.

7.8.1 First Responder Duties: Sequence of Events

The actions taken by the first individuals at a scene have the potential to dramatically alter the course of an investigation, for better or worse.

First responders have numerous responsibilities and their actions may be pivotal in any scene investigation. Most importantly, they must protect themselves and any other professional responders by determining whether the scene is safe to enter. No one should enter any scene until safety concerns have been addressed. Potential hazards are numerous and may include structural, electrical, chemical, animal, and environmental.

> First protect people and then protect evidence.

Ensuring safety of those responding to a scene must remain the highest priority. The next priority is to render aid to those in need and provide life-saving care. Ultimately, people are more important than evidence, and patient care must never be

compromised in an effort to protect evidence. However, first responders must maintain "forensic awareness" while providing life-saving care. In situations involving violent crime, accidental injury, environmental injury, or public health threats, the patient, family, and community are better served when this forensic awareness is maintained. Professional first responders must receive regular training related to this topic so that they fully appreciate the rationale for minimizing their impact on the scene. First responders should also be encouraged to report any actions that may have altered the scene, regardless of how inconsequential those actions may seem. If investigators are made aware of these alterations, they will not use limited resources and time attempting to understand or explain these findings.

If professional responders arrive on scene to find a child clearly deceased, their focus must change from "life-saving" to "information-saving." This may be an extremely difficult transition for professional first responders to make, as they are being asked to switch into a role that is often unfamiliar and extremely uncomfortable. Whenever possible, the deceased child should be left at the scene, in the location and position found. Transfer of a clearly deceased child to a hospital can have devastating effects on the investigation and may ultimately impact the ability to provide accurate cause and manner of death determination. Once an EMS provider enters a scene and verifies the death, additional emergency medical personnel should not enter the scene unless there are other persons in need of medical assistance. Allowing unnecessary responders or bystanders to enter the scene greatly increases the risk of scene contamination and evidence destruction.

7.8.2 Scene Investigators

Once investigators arrive, they must remain aware of scene safety while developing a plan of action for processing the scene. This plan must take into consideration location of the scene(s), size and scope of the scene(s), condition of the human remains, weather, daylight, types of potential evidence available, and resource availability. Investigators must implement a methodical approach to the scene to ensure that the greatest percentage of potential evidence is recognized, documented, and collected. This plan must be well thought out, but must frequently be reevaluated as new information becomes available. During the early stages of a child death investigation, investigators must proceed with caution and awareness that foul play may be a factor. Failing to consider this as an option increases the risk that critical evidence will be overlooked. Concerns regarding suspicious activity or will either be corroborated or eliminated as information comes to light in the investigation.

At the earliest opportunity, scene boundaries should be established. An outermost perimeter can be set out far beyond the bounds of the anticipated area of evidence collection in order to keep onlookers and media at a safe distance. These boundaries can always be made smaller, but they cannot be expanded without significant risk of losing evidence. These barriers should be set to include potential routes of access and egress from the scene. These borders may be determined using natural boundaries, existing structures, crime scene tape, well-positioned vehicles, or any other resources at the investigator's disposal. Within the outermost barrier, at least

two additional boundaries may be set up: one to indicate the broad search area and another to protect the core location within the scene. For example, police vehicles may be used to block a road providing access to a property. Yellow crime scene tape may be set up to include an entire residence, including the driveway and surrounding yard. An inner perimeter of red tape may then be set to include only the particular area where the child's body was found or where an event occurred. Using a different color of tape on the innermost perimeter will draw attention to the fact that even nonessential law enforcement should not enter.

Once boundaries of the scene have been secured, a crime scene log should be established to document anyone who enters the scene. This document, like a Chain of Custody form, provides formal record of all persons who have come in contact with the scene and potential evidence from that scene.

7.9 Double-Team Approach to Child Death Investigations

A double-team approach is a useful process for investigating the death of any child that has been transported from the location of the original event. Children are frequently transported from the scene by caregivers or EMS and, as a result, are often pronounced deceased in a medical facility rather than at the incident location. In a double-team approach to a child death investigation, two investigators simultaneously conduct investigations at two separate locations. One investigator will respond to the location where the child was pronounced deceased, while the other investigator will responded to the incident location where events that led to death occurred. This approach provides investigators an opportunity to gather more information and to compare scene findings and witness statements immediately.

The investigator responding to the medical facility will first conduct an initial physical assessment of the child and will then interview medical providers and professional first responders who may still be present at the medical facility. This investigator will also be able to conduct initial interviews with caregivers who are present at the medical facility as well as begin the process of collecting copies of medical records, antemortem x-rays, laboratory samples, etc. Simultaneously, the investigator responding to the incident location will document the scene and begin to interview caregivers/witnesses who did not respond to the medical facility. The two investigators will frequently communicate their findings to determine if the physical assessment of the child, the scene investigation, and the initial interviews with caregivers and witnesses are consistent. The investigators will then develop a plan to further investigate the areas of concern [1].

7.10 Communication

Information sharing is essential during the acute phase of a child death investigation. Law enforcement, medicolegal death investigators, professional first responders, forensic pathologists, and hospital staff are among a few of the individuals who hold

information that may impact the direction of any investigation. As the investigation unfolds, other individuals/agencies may be identified as possessing information germane to the investigation including family members, caregivers, primary care physicians, social service representatives, home health providers, and employers to name a few. Thoughtful communication with the family is also of paramount importance throughout the entire investigation process.

7.10.1 Caregivers/Family Members

It is imperative that caregivers and family members are treated with great consideration. The cause and manner of infant death are not often obvious from the outset, and the role of caregivers and family members will only emerge with time. An investigator's choice of words and actions can have a profound impact on grieving victims who are suffering the tragic loss of a child. In those cases where the caregivers or family members are guilty of harming the child, the investigation stands to benefit from suspects who continue to freely talk with investigators. Individuals treated with compassion may be more likely to share information than those that are treated with overt suspicion.

7.10.2 Hospital Staff

Communication with hospital personnel is essential when a child is transported to a medical facility. Hospital staff may hold vital information regarding the condition of the body when it arrived at the medical facility, may have interacted with caregivers, and may have overheard communications between witnesses who responded to the hospital. Investigators should also clearly communicate their needs to these medical providers. Historically, medical professionals receive little, if any, training in evidence protection and documentation. Investigators should specifically inquire about items that have been thrown away, destroyed, or returned to family members (memory boxes, dirty diapers in garbage, etc.). Hospital staff most likely to have information relevant to the case include emergency room physicians, nurses, technicians, front-desk staff, radiologists, social workers, and hospital chaplains. If the child is taken to surgery, transported to another hospital, or admitted as an inpatient, the list will grow exponentially.

7.10.3 Forensic Pathologist/Autopsy Facility

Communication between scene investigators and the forensic pathologist who will be conducting the autopsy is crucial. The pathologist will require specific information prior to the autopsy and will then provide law enforcement investigators with autopsy information that may direct further investigation. The pathologist will require specific information prior to the autopsy and will then provide law

enforcement investigators with autopsy information that may direct further investigation. In 2005, the National Association of Medical Examiners (NAME) proposed recommendations for the minimum information required during an infant death investigation. A complete list of their recommendations may be found on NAME's website at http://thename.org [14].

7.11 Scene Considerations

A variety of locations may become the focus of a child death investigation, but a few bear specific mention. Unique considerations at any private residence and daycare/child care facilities will be discussed along with those in which skeletal remains are located. As mentioned earlier, each scene must be examined for the unique and valuable information it may hold. Regardless of the number of scenes, the goal at each is to identify, protect, document, and collect potential evidence. All scenes are susceptible to alteration, contamination, and destruction, so a prompt response is critical if scenes are to be examined in their most pristine state. Although indoor scenes may be better protected from exposure to weather and insect/animal activity, they may be more susceptible to alteration from humans. Well-meaning family/friends may inadvertently alter a scene as they attempt to assist the family by taking out the trash or by washing dishes for example. Subjects may attempt to hide evidence of abuse or neglect against the child, and other individuals may attempt to conceal evidence of illegal activity unrelated to the child's death. Investigators should pay close attention to the presence of small amounts of body fluids such as frank blood or purge on clothing worn by caregivers, which may still be worn by the individual, in the laundry, or in the garbage (Fig. 7.2).

Regardless of the location, the goal is to ensure that all potential evidence is recognized, documented, and collected. It is highly recommended that each area be

Fig. 7.2 Bloody purge found on discarded clothing associated with a crime scene

examined by more than one investigator. Having multiple sets of eyes on each area decreases the likelihood that potential evidence/information will be missed.

7.11.1 General Indoor Scene Considerations

Indoor scenes may be searched using a room-by-room or logical association method. The entire structure should be examined to include all potential entrances and exits to and from the building. The entire area within the structure should be photographed even if the death/injury event appears to have been confined to only one room. Findings that may seem unrelated at the outset may become key pieces of evidence once more details are revealed. Therefore, a methodical approach to the scene is recommended to ensure that all areas are thoroughly assessed.

Following are specific items to assess in a child death investigation with an indoor scene:

1. Type and condition of structure: singe home, apartment, etc.
2. Number of and location of doors: locked or unlocked
2. Windows: open or closed, locked or unlocked; blinds/shutters
3. Thermostat setting (in varying locations throughout residence)
4. Ambient temperature (in varying locations)
5. Heating/cooling source(s): gas, electric, and wood stove, AC, fans, other
6. Water source: city water, private well, public well, bottled water, other
7. Presence and number of stairs/stairways
8. Presence of animals (domestic and otherwise)
9. Presence of insect activity and infestation
10. Potential carbon monoxide sources
11. Strangulation hazards (blinds, swings, etc.)
12. Standing bodies of water (pool, buckets, bathtub)
13. Damage to walls and doors (patterned impressions, punch marks, etc.)
14. Safety hazards accessible to the child (unlocked or open safety gates, cleaning chemicals, medications, drugs, exposed wires, lead paint)
15. Garbage/trashcan contents
16. Refrigerator contents (adequate and appropriate food)
17. Toilets (contents)
18. Contents of laundry hampers and washing machines
19. Sleeping areas (sleeping surfaces, crib safety, etc.)
20. Mold, asbestos, or other potential household toxins

7.11.2 Special Scene Considerations for the Child's Residence

Regardless of where a child dies, an investigation of their primary residence may reveal what the day-to-day life of the child was like, as well as what their final hours

may have entailed. Investigators should thoroughly document the child's sleeping area(s), play area(s), and clothing and hygiene items or the lack of those items. Additionally, the refrigerator should be checked for the presence and quality of food (Fig. 7.3).

7.11.3 Special Scene Considerations for Daycare/Child Care Facility

If an investigation involves a daycare or childcare facility, investigators should familiarize themselves with the specific licensing and operational requirements applicable in that scenario.

7.11.4 Scene–Body Interaction

During a death investigation, the scene and body are inextricably intertwined. Information found on the body must be considered within the context of scene findings and vice versa. If the child's body is at the scene of the original event, the investigator should work with the medical examiner/coroner to document the condition of the body including location found, exact positioning, type and condition of clothing/diaper, signs of external injury, and time of death indicators (postmortem changes). Preliminary documentation of these findings should be completed prior to moving the body whenever possible. Any evidence of traumatic injury should be noted at this time and those findings relayed immediately, but the investigators must bear in mind that a lack of obvious external injury does not preclude the presence of fatal internal injury. Transient or fragile evidence such as fibers, hairs, blood stains, saliva around bite marks, and patterned impressions may be readily lost during the process of moving and storing the body and should therefore be documented and potentially collected from the body before transport from the scene.

Regardless of where a body is examined, investigators must pay particular attention to patterns within livor mortis distribution. Because livor will not form in areas under pressure or tension and will become "fixed" after approximately 8-12 hours, it can provide clues about both time of death and positioning. If the lividity is not fixed, it will blanch to fingertip pressure (Fig. 7.4) and patterns that have formed may disappear when the body is moved (Fig. 7.5).

Investigators must clarify every location the body was placed after the time of discovery. As an example, family may have moved the child from an adult bed to the living room couch, and professional first responders may have moved the child from the couch to the floor. Each of these locations should be thoroughly assessed and documented for pertinent information.

Once the body has received a thorough external exam, the coroner or medical examiner representative may "release" it from the scene or hospital. This release is conditional and only allows for the transportation of the body to a secure facility

Fig. 7.3 Refrigerator contents may provide information on the day-to-day life of the child. The refrigerator contents in photo (b) are more consistent with providing adequate and age-appropriate nutrition for a child than the contents revealed in photo (a)

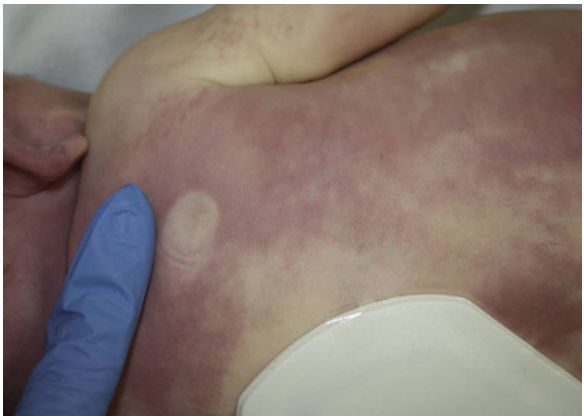

Fig. 7.4 Lividity less than 8–12 h old will generally blanch to fingertip pressure

Fig. 7.5 The left arm of this infant was likely bent while lividity was forming

where it will await autopsy. The body must not be altered, cleansed, or dressed by the funeral home or medical staff. The body itself is evidence, and therefore chain of custody must be maintained until the time of autopsy. This may be accomplished in a variety of ways including by placing a numbered plastic lock on the body bag, container, or cooler (Fig. 7.6). In some cases, diagnostic imaging may be completed in a hospital setting prior to transport for an autopsy. In these cases, chain of custody is maintained by the investigators who accompany the body.

Fig. 7.6 Numbered plastic locks may be used to supplement chain-of-custody documentation

7.11.5 General Outdoor Scene Considerations

Evidence recognition and collection can be challenging even in cases where death is recent and the scene confined. When a body has been placed or left outdoors for any length of time, new challenges present and additional resources must be utilized. With the passage of time, evidence may be dispersed or altered by a variety of natural and artificial agents [15]. Although the influence of an outdoor setting may vary greatly between rural and urban settings, from state to state and season to season, a common theme is the lack of easily defined borders. The result may be an expansive scene with a variety of challenging elements including all manner of natural and man-made features. In all cases, whether involving burial or scattered remains, there are many resources that can significantly improve the scene investigation. Investigators should involve the appropriate specialists early in the process to ensure the greatest retrieval of information. These specialists may include forensically trained anthropologists, cadaver dog handlers, botanists, archaeologists, geophysics specialists, fish and wildlife officers, and entomologists, among others.

In addition to recovering the greatest possible percentage of the remains, it is critical to recover as much information as possible from the site and associated evidence. It is inadequate to simply gather as many bones or body parts as possible and transport to an expert for evaluation. There are many steps that must be taken, in sequence, in order for the maximum amount of detail to be salvaged from the scene. The value of including a forensic anthropologist in the early stages of recovery of skeletal remains cannot be overstated (Figs. 7.7 and 7.8).

Even if the identity of the victim is known, inclusion of the forensic anthropologist in the scene recovery will increase the amount of information that they may be able to provide during the subsequent evaluation of the remains. In cases where unidentified remains are located, the forensic anthropologist will be of even greater value as they create a biological profile of the individual. Armed with information about age, race, sex, stature, and unique physical characteristics, the investigator is able to begin the process of elimination and identification in the field. Obtaining

Fig. 7.7 One of the many benefits of including forensic anthropologists in the recovery of remains is the immediate identification and inventory of remains

Fig. 7.8 In order to preserve details regarding relative location of remains, elements should be individually photographed, labeled, and mapped prior to removal from the scene

this information early in an investigation is of great benefit for the allocation of additional resources.

Questions a forensic anthropologist may be able to address in the field include the following:

- Is this item a bone?
- Is it a human bone?
- Are the remains contemporary or archaeological?

- Is there a single individual or multiple individuals?
- Which bones have been recovered? Which bones are missing?
- What are the subject's age range, race/ancestry, sex, and stature? Are the remains potentially Native American/historical and thereby protected by specific regulations/guidelines?
- What identifiable characteristics can be used to identify the subject?
- Are there any obvious injuries?
- Is damage to a bone the result of perimortem trauma, postmortem activities, or postmortem animal scavenging?

Use of archaeological methods may optimize evidence recovery and documentation in a burial or surface scatter scenario and these techniques may be second nature to many forensic anthropologists. For the same reason, archaeologists can be invaluable assets in efforts to excavate, document, map, and interpret the stratigraphic features or spatial context of buried items.

When properly processed, a burial or scattered remains scene can reveal great detail about what happened as well as what did not happen. The original position of the remains and associated evidence hold great value, so all findings must be documented horizontally and vertically. As with any scene investigation, the individuals processing the scene have only one opportunity to recognize, document, and recover relevant information. Processing can be equated to a "careful destruction" of evidence. While attempting to uncover information, other information is inevitably destroyed. Therefore, great care must be taken in the planning phase. Weather, daylight, and resource availability are just a few of the factors that must be taken into consideration in order to provide the most optimal environment for data recovery.

If remains are left outdoors for any length of time, they will likely be influenced by environmental factors such as weather, erosion, topography, and scavengers. As a result, with time, they may become scattered over a relatively large area and take on the color of the surrounding matrix (Fig. 7.9).

Basic procedures for recovery of these remains are similar to any other evidence search. The extent and breadth of the search should be dictated by resource availability, topography, and common sense. The search should continue well beyond the location where the most peripheral remains have been located, particularly when traveling in a downhill direction. Scavengers may take remains along their usual path of travel or to any other location where they feel more protected or elevated above possible threats. Items may be transported into trees, nests, and burrows. Search teams should be directed to flag any item that did not naturally occur in that location, regardless of whether they think it relates to the particular event being investigated. Items can always be disposed of at a later time if they are determined not to be related to the case at hand.

Methods used to search large outdoor areas include line, grid, strip, wheel, and spiral searches [13]. Each of these names indicates the shape of the search pattern, but more important than the shape of the search pattern is the fact that no ground is missed. Initial searches for a scene location may involve searching from a standing position at some distance apart. Once a scene is located and the detailed physical

Fig. 7.9 Skeletal remains will eventually take on the same color as the surrounding soil

evidence search begins, the searching should be performed on hands and knees with very little space between searchers. Specially trained search and rescue personnel can be an invaluable asset when conducting evidence searches in an outdoor setting (Fig. 7.10).

Fig. 7.10 Search and rescue workers at an outdoor scene. Searchers are close to the ground and in close proximity to each other to reduce the chance of overlooking evidence

Regardless of the search method employed, it is critical that high-probability locations are identified and searched exhaustively with significant overlap of the areas covered by adjacent searchers.

In situations where search dogs may be used, it is imperative that handlers are consulted early in the process. Decreasing the amount of distraction at scenes may increase the odds that dogs will be of assistance. Smoking, eating, and using perfume should be discouraged when dogs are working. Individual handlers are the best source for particular requirements/requests as they know the capabilities and needs of their animals.

Search and rescue teams a resource whose value cannot be overstated. The searchers will have the greatest chance of success when investigators educate them about what to expect based on terrain, method of disposal, and passage of time. Investigators should provide searchers with as much detail about the case as possible without compromising the investigation or eventual prosecution. In addition to details regarding specific items to watch for (such as clothing last seen on the individual), they must be reminded that bones take on the color of their environment and may be very difficult to recognize. They should also be given an introduction to the soil alterations and changes in vegetation that may be expected around a clandestine burial. Searchers must be instructed to flag all potential remains or associated evidence and to leave those items in the place without picking them up. Once all items have been flagged, they should be sketched, mapped, photographed, and finally retrieved.

The method of mapping best suited for a case will vary with the terrain. In urban or heavily wooded locations that do not permit the line-of-sight required for Total Data Station operation, a baseline method is an acceptable alternative. In either case, a datum (fixed point) must be selected. This datum may consist of a natural feature or may be created by driving a section of rebar into the ground. The benefit of using rebar is that it will not be lost if the natural feature is removed and it may be located with the assistance of a metal detector in the future. The site location should be documented by GPS coordinates as well as in relationship to local permanent features such as roadways or water bodies.

Detailed instruction for excavation of buried remains is outside the scope of this chapter, and the manner in which to best proceed will vary greatly on a case-by-case basis. Numerous factors influence the preferred methods of recovery, but in all cases the chosen method must result in a systematic and meticulously documented process. Burial scenes are generally more compact than their scattered counterparts, but they are complicated by a multitude of other factors.

Proper excavation of buried remains is a specialty that requires significant training and experience. Participation in a hands-on skeletal recovery class will greatly improve chances of success in an actual case (Fig. 7.11).

The following key points should be kept in mind during the processing of outdoor scenes:

- Include appropriate expert assistance early in the process.
- Assign photography, mapping, sketching, screening, and excavating duties to appropriately trained individuals.

Fig. 7.11 Hands-on skeletal remains recovery classes are offered across the country and offer valuable information to the investigator

- Photograph every body part, item, or bone.
- Closely inspect surface items such as leaf litter, loose soil, and vegetation for associated items of evidentiary value.
- Stake a grid around the burial (or concentration of surface remains) to aid in measurement and diagramming.
- Use plastic, blunt tools to reduce likelihood of inadvertent destruction/damage to the bones and associated evidence.
- Remove soil in a systematic, layer-by-layer approach.
- Meticulously document each finding in a three-dimensional context.
- Attempt to "pedestal" the findings (i.e., remove surrounding soil without disturbing the position).
- Screen soil as it is excavated.
- Photograph, sketch, and map items in relation to the fixed datum point before they are retrieved.
- Examine the surface under the remains for shoe prints, tool marks, cigarette butts, etc.
- Continue to dig a reasonable depth below the lowest recovered remains as small items can filter down through the soil.

7.12 Scene Documentation

Meticulous documentation of scene findings is essential in any death investigation. This documentation is a record of the evidentiary findings and aids the overall accuracy of data collection, analysis, and potential interpretation. Forms of documentation that will be discussed here include photo documentation, video photography, note-taking, diagrams, sketches, and maps.

7.12.1 Photo Documentation

Photo documentation is one of the most widely used, accurate, and objective forms of scene documentation. Photographs capture scene findings that may have otherwise been overlooked and record details as they were at that moment in time. Photographs also serve to aid in the description of findings and details that may otherwise be difficult to articulate.

The scene should be photographed as soon as possible in an effort to capture findings in an undisturbed state. The entire scene should be photographed prior to evidence collection except in rare cases where fragile/transient evidence may be lost during the time it takes to acquire photographs.

Photographic documentation should include a combination of long-range, medium-range, and close-up photographs to allow investigators to set the scene, reveal relationships between items, and present specific details.

Long-range (overall) photographs are used to provide context, reveal the surrounding environment, and show where individual items of interest are located within the greater scene. It is good practice to begin photo documentation of any scene with overlapping 360° photographs taken from a vantage point at the entrance to, and/or near the middle of, the scene. If the scene is located indoors, this same procedure should be used to document the surrounding outdoor setting. Additional long-range photographs may include all entrances and exits to a structure as well as routes of access/egress. Once inside a structure, the same technique of overlapping 360° photographs can be used within each room. Smaller rooms may require use of a wide-angle lens or an increase in the number of photographs to adequately capture the entire room.

Medium-range photographs reveal less of the scene but show where particular items are in relationship to their immediate surroundings. Any item of interest should be photographed from at least two sides to reveal spatial relationship and allow for depth perception.

Close-up photographs are intended to reveal the greatest detail about a particular item and can later be used for comparison and/or identification purposes. To obtain a quality close-up photograph, it may be necessary to diffuse the lighting and utilize the macro-photography feature present on most digital cameras. Items of evidence that may later be compared for size or shape (patterned injuries, bite marks, tool marks, etc.) must be photographed from a precise 90° perspective to prevent distortion with the camera aligned such that the back of the camera is parallel to the surface being photographed. If a scale is used to record the size of the item, the scale must be in the same plane as the item of interest. Evidentiary quality photographs should be composed such that the item of interest fills the frame and unrelated items are excluded. Whenever possible, an item must first be photographed as found before being photographed with evidence markers or scales.

The use of a photo log may be beneficial whenever multiple photographers document a scene or when there is a high likelihood that the photographs will be presented in a courtroom setting. This log provides a way to easily present the photographs to peers, experts, or jurors. It will also aid in identifying items of interest

years after the event when the investigator has long forgotten the significance of the photographs or if the photographer is no longer a member of the investigating team. The simplest photo log may include only the name of the photographer, date, case number, photograph number, and brief description of the photograph. The photo log is used only to identify the items in the photograph and not to interpret them.

Following are the key points for scene photography:

- Take photographs as soon as possible. The more time that passes, the greater the likelihood that items will be moved or conditions will change.
- Never delete digital photographs. Even the blurry, seemingly useless, and poor-quality photographs must be maintained. Not only are they a form of evidence that must be accounted for, but they may also hold some important piece of information that is not yet recognized.
- When photographing close-up items, use a macro-lens or the macro-setting on your digital camera. This setting is routinely indicated by a small flower icon and allows your camera to focus on items much closer to the lens. When using the macro-setting, the flash will often need to be manually turned off or diffused in some manner (Fig. 7.12).
- Impressions and imprints often benefit from the use of oblique lighting. Light coming from the side will create shadows and may reveal the contrast, depth, and texture.
- Use photography to document a sequence of events or removal of layers. Take photographs before and after the scene is altered in any way.
- Use photographs to record what is present as well as what is not.
- A poor-quality photograph is usually better than no photograph at all.
- During child death investigations in which doll reenactments are being utilized, still photographs should be taken of doll placement in the position in which the child was last known to be alive as well as the location and position where the child was found deceased.
- Photographs should include overall as well as close-up views of areas of interest. The mouth and nose are of particular concern in cases where suffocation/asphyxiation is a possibility.

7.12.2 Video Photography/Recording

Video photography is an excellent supplement to still photography. It is good practice to videotape the entire scene prior to the scene being processed. It may be helpful to assign an individual to help guide the videographer through the scence and to prevent unintentional disturbance of evidence. Audio recording capabilities should be turned off during video recording, or all persons in the vicinity should be informed that their comments are being recorded.

During child death investigations, video recording the doll reenactment has shown to be a powerful tool for documenting the witness's description and placement of the doll. The video recording captures their choice of words and provides a

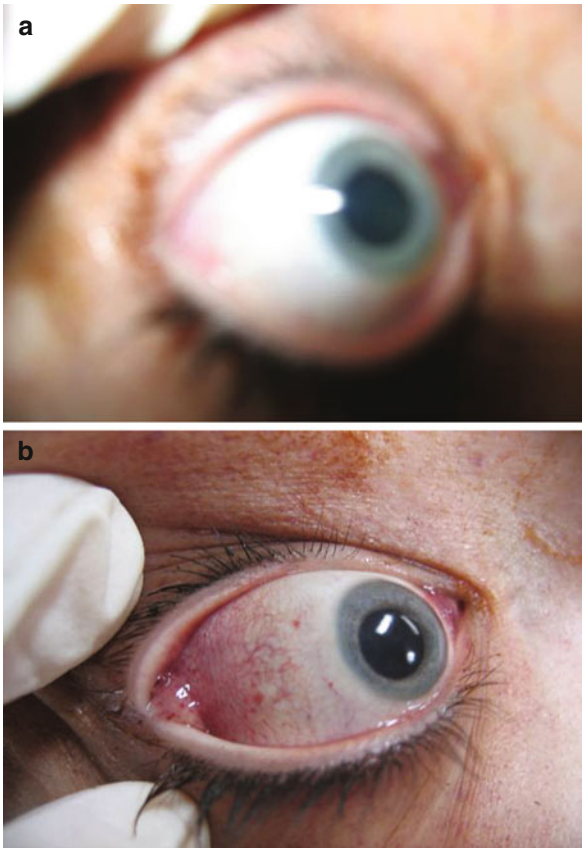

Fig. 7.12 Macro-settings are useful for close-up photography. (**a**) This photograph was taken without engaging the macro-setting and with the flash on. Notice that not only is the photograph blurry, but the details are also obscured by the "hot spot" created by the flash. (**b**) This photograph was taken with the flash turned off and the macro-setting engaged

visual permanent record of their description of the incident, which may prove to be useful later in the investigation [16].

7.12.3 Note-Taking

The importance of meticulous note-taking cannot be overstated. Many investigations begin with copious notes and end with scant illegible scribbles that are later unable to be deciphered and are therefore useless. Whether notes are placed on a standardized form or are free flowing, it is critical to take the time to record findings and actions. The most astute observations will be useless if the investigator cannot remember them at the time of writing a report or testifying in court.

Scene notes should include, at a minimum, the following:

- Time of arrival and departure
- Initial observations of conditional evidence (lights, doors, temperature, smells)

- Verbatim statements
- Conditions or items that cause you to form an opinion about what happened
- Findings that make other scenarios unlikely or impossible

7.12.4 Sketches/Diagrams/Maps

Scene sketches, diagrams, and maps are useful in providing context, orientation, and spatial relationships. They may serve as an investigative aid during interviews and may serve as demonstrative aids in court. Key features of any diagram include compass orientation, permanent reference points, measurements from reference points to items of interest, and associated objects that aid in establishing location (roads, walls, water bodies, light poles, fire hydrants, etc.). Most diagrams are not drawn to scale, and this should be clear on the legend. Scene investigators should indicate whether metric or English measurements were utilized.

7.13 Conclusion

Scene investigation is a critical component of any death investigation and a child death investigation may involve more than one scene. A prompt, thoughtful evaluation of each scene will increase the likelihood that key evidence is recovered and that an accurate cause and manner of death determination can be made.

Suggested Reading

American Board of Medicolegal Death Investigators, Inc. (ABMDI), http://www.slu.edu/organizations/abmdi/.

Byers S. Introduction to Forensic Anthropology, 3rd rev. ed. Boston, MA: Allyn and Bacon Press, 2007.

Center for Disease Control and Prevention, Sudden Unexplained Infant Death Investigation Initiate (SUIDI): Overview, available at http://www.cdc.gov/SIDS/SUID/htm.

Center for Disease Control and Prevention, Sudden Unexplained Infant Death Investigation Reporting Form. Additional Investigative Scene Forms: Body Diagram forms, available at http://www.cdc.gov/SIDS/PDF/SUIDIforms.pdf.

Haskell NH, Williams RE, editors. Entomology & Death: A Procedural Guide. Clemson: East Park Printing, 2008.

Melbye J, Jimenez SB. Chain of Custody from the Field to the Courtroom. In: Haglund WD, Sorg MH, editors. Forensic Taphonomy: The Postmortem Fate of Human Remains. Boca Raton, FL: CRC Press, 1997:65–75.

Miller MT. Crime Scene Investigation. In: James SH, Nordby JJ, editors. Forensic Science: An Introduction to Scientific and Investigative Techniques. Boca Raton, FL: CRC Press, 2009:167–192.

National Association of Medical Examiners (NAME). http://www.thename.org.

Pasquale-Styles MA, Tackitt PL, Schmidt CJ. Infant Death Scene Investigation and the Assessment of Potential Risk Factors for Asphyxia: A Review of 209 Sudden Unexpected Infant Deaths. J Forensic Sci 2007 July;52(4):924–929.

Scott DD, Connor M. Context Delicti: Archaeological Context in Forensic Work. In: Haglund WD, Sorg MH, editors. Forensic Taphonomy: The Postmortem Fate of Human Remains. Boca Raton, FL: CRC Press, 1997:27–38.

Spitz WU, Spitz DJ, editors. Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation. Springfield: Charles T. Thomas, 2006.

Ubelaker D. Taphonomic Applications in Forensic Anthropology. In: Haglund WD, Sorg MH, editors. Forensic Taphonomy: The Postmortem Fate of Human Remains. Boca Raton, FL: CRC Press, 1997:77–90.

U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. Crime Scene Investigation: A Guide for Law Enforcement. Washington, DC: U.S. Department of Justice, 2000. www.ncjrs.gov/pdffiles1/nij/ 178280.pdf.

U.S. Department of Justice, Office of Justice Programs, National Institute of Justice. Death Investigation: A Guide for the Scene Investigator. Washington, DC: U.S. Department of Justice, 1999. www.ncjrs.gov/pdffiles/167568.pdf

American Academy of Pediatrics, Hymel KP, Committee on Child Abuse and Neglect, National Association of Medical Examiners. Distinguishing sudden infant death syndrome from child abuse fatalities. Pediatrics 2006 Jul;118(1):421–427.

References

1. O'Neal BJ. Investigating Infant Deaths. Boca Raton, FL: CRC Press, 2007.
2. Adams VI, Flomenbaum MA, Hirsch CS. Trauma and Disease. In: Spitz WU, editor. Spitz and Fisher's: Medicolegal Investigation of Death, 4th ed. Springfield: Charles C Thomas, 2006:436–459.
3. Shapiro-Mendoza CK, Tomashek KM, Anderson, RN, Wingo J. Recent national trends in sudden, unexpected infant death: More evidence supporting a change in classification or reporting. Am J Epidemiol 2006;163(8):762–792.
4. Malloy MH, MacDorman M. Changes in the classification of sudden unexpected infant deaths: United States, 1992–2001. Pediatrics 2005;115(5):1247–1253.
5. Center of disease, control and prevention. Guidelines for death scene investigators of sudden, unexplained infant deaths: Recommendations of the interagency panel on sudden infant death syndrome. Morbid Mortal Wkly Rep 1996;45:RR–10.
6. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. Pediatr Pathol 1991;11(5):677–684.
7. American Academy of Pediatrics, Committee on Child Abuse and Neglect and National Association of Medical Examiners. Pediatrics 2006;118:421–427. Retrieved February 1, 2010, from http://aapolicy.aappublications.or/cgi/content/reprint/pediatrics;118/1/421.pdf
8. http://thename.org – Writing Cause of Death Statements in SIDS 2002 A Guide for Manner of Death Classification, 1st ed. pp 15–18 Sudden Infant Death Syndrome and Related Infant Deaths
9. Swanson CR, Chamelin NC, Territo L, Taylor RW. Criminal Investigation, 9th ed. Boston, MA: McGraw-Hill, 2006.
10. Houck M, Siegel, J. Fundamentals of Forensic Science. Oxford: Elsevier, 2006.
11. James S, Nordby J, editors. Forensic Science: An Introduction to Scientific and Investigative Techniques, 3rd rev. ed. Boca Raton, FL: CRC Press, 2005.

12. Kirk PL. Crime Investigation: Physical Evidence and the Police Laboratory. New York, NY: Interscience, 1953.
13. Geberth, VG. Practical Homicide Investigation: Tactics, Procedures, and Forensic Techniques, 4th ed. Boca Raton, FL: CRC Press, 2006.
14. Corey TS, Hanzlick J, Nelson C, Krous H. A Functional Approach to Sudden Unexpected Infant Death. Prepared by the NAME Ad Hoc Committee on Sudden Unexplained Infant Death. Approved by the NAME Board of Directors on October 14, 2005. http://www.thename.org
15. Dirkmatt D, Adovasio JM. The Role of Archeology in the Recovery and Interpretation of Human Remains from an Outdoor Forensic Setting. In: Haglund WD, Sorg MH, editors. Forensic Taphonomy: The Postmortem Fate of Human Remains. Boca Raton, FL: CRC Press, 1997:39–64.
16. O'Neal BJ, Wooten RH. Child Death Investigation from Beginning to End. Presented at the International Association of Forensic Nurses Scientific Assembly. Pittsburg, PA, October 2010.