

Death Scene Investigation



A FIELD GUIDE

SCOTT A. WAGNER, MD

 CRC Press
Taylor & Francis Group

Death Scene Investigation

A FIELD GUIDE

Death Scene Investigation

A FIELD GUIDE

SCOTT A. WAGNER, MD



CRC Press

Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

© 2009 by Taylor & Francis Group, LLC
CRC Press is an imprint of Taylor & Francis Group, an Informa business

No claim to original U.S. Government works
Printed in the United States of America on acid-free paper
10 9 8 7 6 5 4 3 2 1

International Standard Book Number-13: 978-1-4200-8676-8 (Softcover)

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, please access www.copyright.com (<http://www.copyright.com/>) or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. CCC is a not-for-profit organization that provides licenses and registration for a variety of users. For organizations that have been granted a photocopy license by the CCC, a separate system of payment has been arranged.

Trademark Notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Library of Congress Cataloging-in-Publication Data

Wagner, Scott.
Death scene investigation : a field guide / Scott A. Wagner.
p. ; cm.
Includes bibliographical references and index.
ISBN 978-1-4200-8676-8 (alk. paper)
1. Forensic pathology. 2. Death--Causes. 3. Autopsy. I. Title.
[DNLM: 1. Forensic Medicine--methods. 2. Autopsy--standards. W 800
W135d 2008]

RA1063.4.W32 2008
614'.1--dc22

2008040361

Visit the Taylor & Francis Web site at
<http://www.taylorandfrancis.com>
and the CRC Press Web site at
<http://www.crcpress.com>

Dedication

This book is dedicated to the memory of Phyllis Wagner

Contents

Preface	xiii
Acknowledgments	xv
1 Guidelines for the Death Scene Investigator	1
Purpose of the Death Investigation	1
Role of the Death Scene Investigator (DSI)	2
Philosophy of Death Investigation	3
Notification of a Death	3
Discovery of Deceased.....	5
2 The Body and the Scene	7
Statutory Responsibilities	7
Confirm or Validate the Death	7
Securing the Death Scene	8
Evidence at the Death Scene.....	9
Documentation of the Scene and the Body.....	9
Documentation by Photography	9
Documentation by Diagrams	11
Forming Preliminary Opinions: Be Suspicious but Objective	11
Examination of the Body at the Scene	13
Pathologist's Role at the Scene.....	14
Other Forensic Experts at the Scene.....	15
3 Assessment of the Body at the Scene	17
Position of the Body at the Scene.....	17
Blood at the Scene	17
Vomitus at the Scene.....	18
Physical Examination of the Body at the Scene.....	18
The Scene Assessment.....	18
Starting the Scene Assessment of the Body and Time of Death	19
Rigor Mortis	19
Livor Mortis (Blood Settling)	20
Body Cooling (Algor Mortis).....	22
Eyes	24

Clothing	24
Determining Time of Death by Scene Investigation.....	25
Forensic Entomology and Time of Death	25
Forensic Botany and Time of Death	26
Decomposition	26
Other Decompositional Changes.....	27
Adipocere	27
Mummification.....	27
4 Detailed Physical Assessment of the Body at the Scene	29
Introduction	29
Common External Signs of Disease or Trauma	29
General	29
Skin	31
Extremities	34
Trunk	36
5 The Medical History and Medical Records	39
Obtaining a Medical History at the Scene.....	39
Searching the Scene	39
Obtaining Medical Records or Information by Phone.....	40
Reviewing Medical Records	42
6 Natural Diseases and Death Investigation	45
Introduction	45
Sudden Death.....	45
Cardiac System	46
Ischemic Heart Disease (Atherosclerotic Cardiovascular Disease)	46
Respiratory System.....	49
Upper Respiratory System.....	49
Lower Respiratory System	50
Gastrointestinal Tract and Pancreas	55
Massive, Fatal Hematemesis (Vomiting Blood)	55
Bowel Infarctions.....	55
Pancreatitis	56
Liver	56
Fatty Change or Fatty Metamorphosis.....	56
Cirrhosis	57
Hepatitis	57
Vascular System.....	58

Aortic Aneurysm and Aortic Dissection	58
Central Nervous System (CNS) Disorders	59
Epilepsy (Seizure Disorder)	59
Subarachnoid Hemorrhage	59
Strokes	60
Meningitis	60
Encephalitis	61
Systemic Diseases	62
Carcinomatosis	62
Sepsis, Shock, and Death	62
Diabetes Mellitus	63
Alcohol Abuse	64
Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS).....	65
7 Traumatic Injuries	67
Blunt Force Injuries versus Sharp Force Injuries	67
The Importance of Terminology	67
Blunt Force Injuries	67
Features of Blunt Force Injuries	68
Contusions	68
Abrasions	71
Lacerations (Tears)	72
Avulsions.....	74
Crush Injuries	76
Fractures	77
Sharp Force Injuries.....	78
Stab Wounds	78
Incised Wounds	79
Hesitation Marks or Wounds.....	80
Defense Wounds or Cuts.....	81
Puncture Wounds.....	81
Chopping Wounds	81
Firearms and Gunshot Wounds	81
Shotgun Wounds	90
Description of Wounds	91
Miscellaneous Firearm and Gunshot Wound Facts.....	91
Asphyxia	92
Compression of the Neck	93
Chemical Asphyxia	96
Suffocation.....	96
Lack of Oxygen in the Environment: “Environmental Asphyxia”	97

Mechanical and Positional Asphyxia	99
Drowning	100
Electrocution	101
Lightning	101
Fire Deaths and Thermal Injuries.....	102
Hyperthermia	103
Hypothermia.....	103
Motor Vehicle Occupant Injuries	104
Pedestrian Injuries	104
Investigation of Childhood Fatalities and Child Abuse	105
Battered-Child Syndrome.....	106
Shaken (Infant) Impact Syndrome	107
Neglect, a Crime of Omission	108
Sudden Infant Death Syndrome (SIDS).....	108
8 Identification Methods	111
Collection of Evidence at the Scene.....	111
Visual Identification	111
Other Visual Methods of Identification.....	112
“Softer” Forms of Identification	113
Scientific Forms of Identification.....	113
DNA Analysis.....	113
Fingerprints	114
Dental Identification	116
X-Ray Comparisons and Medical Devices.....	116
Crime Scene Evidence Collection.....	118
Scene Investigation and Specific Forms of Evidence.....	118
9 Signs of Cardiopulmonary Resuscitation and Treatment	121
Key to Figure 9.1	122
10 Signs of Previous Surgeries and Procedures	125
Key to Figure 10.1.....	126
11 The Medical-Legal Autopsy	127
Purpose of the Autopsy	127
Misconceptions of the Autopsy.....	128
Jurisdiction and Permission for Autopsies.....	128
Death Investigations Requiring an Autopsy	129
Cases that Usually Require an Autopsy	129

Natural Deaths.....	130
Unnatural Deaths.....	131
The Autopsy: Assembling a Puzzle.....	133
External Examination of the Body.....	134
Suiting Up: Universal Precautions.....	134
Documenting Traumatic Injuries.....	141
External Examination.....	144
Specific Body Areas.....	144
Internal Examination.....	159
Opening of Body Cavities and Initial Assessment.....	159
Individual Organ Exam.....	163
Examination of the Head, Skull, Brain, and Spinal Cord.....	164
Microscopic Examination.....	165
Postmortem Laboratory Analysis.....	167
Specimens to Obtain at Autopsy.....	175
Certifying the Death.....	182
12 Forensic Experts.....	185
Introduction.....	185
Accident Reconstructionist.....	185
Forensic Anthropologist.....	185
Forensic Botanist.....	186
Forensic Geologist.....	186
Crime Scene Technician.....	186
Criminalist and Criminalistics.....	187
Forensic Engineer.....	187
Forensic Entomologist.....	188
Forensic Pathologist.....	188
Forensic Odontologist (Dentist).....	189
Forensic Radiologist.....	189
Questioned Documents Examiner.....	189
Serologist.....	189
Toxicologist.....	190
Bibliography.....	191
Appendix A: Medical Terminology.....	193
Appendix B: Prescription Medicines.....	203
Index.....	223

Preface

Death Investigation is an art that is never mastered. It is the fusion of science, old-fashioned footwork, and intuition. Each death scene is unique in some way and presents new challenges to even the most seasoned investigator among us. Even more, long or late hours, unpleasant environmental conditions, and difficult psychosocial situations further complicate the job. It is during those tough times when having and following a protocol pays off. Death investigation scenarios can vary widely but protocols are the tool to keep the results consistent. Skirting protocols for convenience or other reasons can lead to erroneous conclusions — or worse, lost convictions.

During the entire death investigation, from initial call to final courtroom testimony, the *way* things are done is as important as *what* is done. Having and following a standard routine for death investigation minimizes potential errors. Having the appropriate resources and tools at hand to make the job easier and more efficient is also important. Through the course of his or her work, the death investigator must interface with law enforcement, district attorneys, defense attorneys, families, friends, witnesses, medical professionals, media, and countless others in the community. Producing a death investigator's handbook for all situations, in all jurisdictions, is not possible. We seek here to provide a book that is a useful tool for the death investigator with at least some basic training.

Because the majority of deaths in any medical examiner's or coroner's office are natural, emphasis is placed in this area. Death investigators come from varying backgrounds. Those from nonmedical fields will find the drug and disease section useful. Medical terms are often really a "second language," and the words can have odd spellings. The book aims to be a field guide for basic medical information. For those without forensic backgrounds, the forensic glossary can be of use. Words have specific meanings in forensic pathology. The current usage and meaning of these words are given.

Many deaths, usually natural, do not require scene visits, especially those that occur in health-care facilities. The death investigator's role is slightly different in these cases, usually requiring discussions with medical personnel and obtaining medical records. A fair portion of this book also deals with handling medical information.

Finally, because the book is a field guide, it will not answer all questions raised. However, references are supplied for seeking further information when

one gets back to the office. For the death investigator, knowing where to look for an answer is more important than memorizing a great deal of data.

It is my intention that the information and images in this book be used only by the professionals and students in the fields of or related to death scene investigation, law enforcement, death investigation, and law, or by funeral directors. Improper uses of these images can be a violation of the law, and using these photographs in a salacious manner violates the basic ethics the author and his colleagues uphold. The first lesson to learn in death scene investigation is reverence for the deceased and their families. In keeping with this reverence, we honor the deceased by using the information learned to study diseases and injuries for the benefit of the living.

Scott A. Wagner, M.D.

Acknowledgments

The author would like to thank the estate of Jay Dix, M.D., for permission to use the medical technology, diagrams, and drug sections of this book. Dr. Dix's book, *Handbook for Death Scene Investigators*, was a strong influence for both the idea and format of this book. Thanks to Robert Gutekunst, M.D., for proofreading the manuscript and providing suggestions. Others essential to the success of this book include Alexis Rodriguez, for research on Web sites; Dick Alfeld for fielding questions; and my teachers for the inspiration. Amanda and Natalie, thanks for understanding.

Guidelines for the Death Scene Investigator

1

Purpose of the Death Investigation

Although the primary goal of a death investigation is to establish the cause and manner of death, the role of the investigator extends much further than simply answering these two questions. A common question asked is, “Why does it matter? The person is dead.” While it is true that the dead cannot benefit, the value in death investigation is to benefit the living and future generations. In a culture that values life, explaining the death in a public forum (the meaning of “forensic”) is crucial for many reasons. And this interest goes beyond simple curiosity. Listed below are some common reasons that death investigations are performed for the benefit of all living persons.

Death investigation benefits include:

1. Families of the deceased:
 - Discover genetic/inherited disorders
 - Collection of death benefits, e.g., life insurance, black lung funds
 - Answer questions about the death, e.g., “why did he complain of headaches?”
 - Psychological benefit of knowing the truth, peace of mind
2. Legal systems, civil and criminal:
 - Provide evidence for prosecution in a criminal matter causing death (e.g., murder, manslaughter, neglect of a dependant causing death, etc.)
 - Provide evidence to exonerate a person under suspicion
 - Provide evidence for civil matters, such as negligence causing death
 - Death of a person in custody
3. Public health and safety:
 - Identify infectious diseases, both new and old

- Identify defective devices or products that can cause death
 - Identify trends in deaths to develop strategies for the future (e.g., sudden infant death syndrome [SIDS] death rate)
4. Medical care quality:
- May be conducted within the hospital or institution or by the medical examiner or coroner
 - Evaluation of the effectiveness of treatments and therapy
 - Evaluation of the potential errors of individuals or the system
 - Evaluation of transplant donors for signs of disease or injuries that might affect the transplant recipient
 - Research (e.g., to evaluate the adverse effects of a novel drug or therapy)

Role of the Death Scene Investigator (DSI)

The death scene investigator (DSI) is a coroner, medical examiner, or a death investigator charged by the federal government, state, county, parish, or municipality with conducting death investigations. The death investigator commonly works under the direction of the medical examiner or coroner.

Death investigation is accomplished by the interaction of many individuals with varying expertise. Often, the DSI coordinates many of the activities, agencies, and final outcomes regarding the death. The families and loved ones of the deceased often have many questions about how the person died. Law enforcement and prosecution need the investigator's input. Environmental challenges such as noting the cherry-red lividity of carbon monoxide poisoning might only be recognized by the DSI, thus saving the lives of others who might inhabit the building with a faulty furnace. And finally, the pathologist will have questions at the autopsy, as a part of a complete investigation. The investigator is the central hub in the continually turning wheel of death investigation and its subsequent resolution.

Death investigators come from many different backgrounds, which often include law enforcement, medical, funeral directors, and even the clergy. Many investigators bring their past experiences to the field of death investigation and are then trained on the job. There are many training programs available, but few uniform, nationally recognized standards. The American Board of Medicolegal Death Investigators (ABMDI) was founded in the late 1990s to develop a standard training curriculum. Some death investigators are required to obtain this certification.

Philosophy of Death Investigation

In death investigation, the body is the most important piece of evidence. The investigation involves focusing on the body and the attached trace evidence. In forensic pathology, it is often stated that one “takes the victim as he finds him.” This axiom simply means that no assumptions are made, and the investigation starts with the body, examining the injuries, diseases, and evidence present to arrive at a cause or manner of death. Observations become facts. When sufficient facts are available, an opinion can be formed. If new facts become available, the opinion can change.

Notification of a Death

The wheels are set in motion by the first call of a death to the coroner’s or medical examiner’s office. These calls are usually received from law enforcement dispatch, but can originate from health-care facilities, first responders, or funeral homes and other agencies. Having received the notification, the investigation can take on various forms and depths of inquiry depending on the type of death and the circumstances. Taking the initial call, it is important to know if the case is under one’s jurisdiction. Below is a list of cases that fall under the jurisdiction of the coroner or medical examiner in many states. Please note that most any death, if suspicious, can come into one’s jurisdiction. Generally, jurisdiction over a death is determined by the county in which the death occurred. Exceptions to this would include a death on a ship or airliner, where the jurisdiction would be the nearest port or the airport where the plane lands. Check protocols and medical examiner or coroner laws in your area for details.

In many states, a ny individual who has knowledge of a suspicious or unnatural death is expected, by law, to report this. Each state has its own state autopsy laws, state anatomy laws, or postmortem examination laws. Deaths that are commonly reported to a medical examiner or coroner are as follows:

- Deaths under unexplained, unusual, suspicious, or unnatural circumstances
- Homicides
- Deaths due to accident, even when the accident does not appear to be the primary cause of death
- Poisoning deaths
- Deaths in which there is no attending physician, or the deceased has not seen a physician recently (30 to 120 days)

- Deaths in which a physician will not sign the death certificate
- Deaths from infectious disease that pose a potential public health risk
- Maternal deaths from abortion
- Stillborn fetus 20 weeks or older whose death was not attended by a medical practitioner
- Death of an inmate or a person in custody
- Deaths during surgery or in proximity of a diagnostic or therapeutic procedure
- Deaths related to a disease or injury acquired or potentially acquired at work
- Sudden unexpected death of a person who suffered a fracture in the past 6 months
- Deaths of organ and transplant donors
- Death of a child, less than 14 years, in which at least two physicians will not sign the death certificate
- Any death in which there is doubt about reporting, should be discussed with the medical examiner/coroner's office (MEC)

The duties of the DSI take him or her to many different places and facilities in the community. The DSI will encounter all types of death cases — from homicides to natural deaths. The following is a summary of the scope of cases commonly encountered by the DSI:

- Medical facility deaths of persons with previously known lethal disease, in which the physician will sign the death certificate
- Home or hospice deaths of persons with previously known lethal disease in which the physician will sign the death certificate
- Medical facility deaths where injury occurred in the facility (e.g., a fall or death during surgery)
- Medical facility deaths where an injured person was taken to the facility (e.g., initially survived gunshot wound of the head)
- Deaths of unknown cause that occur at home
- Deaths involving a motor vehicle
- Deaths in custody
- Deaths in the workplace
- Suspicious deaths or homicides at any location
- Mass fatalities (airliner, train, subway)
- Airplane crash fatalities (smaller aircraft)
- Suicides at the home
- Alleged suicides away from the home

It is the duty of the DSI to obtain crucial data regarding the demographics of a given case. Many find it easy to obtain this information as

early as possible in the death investigation. Each MEC office has its own set of demographic data to be collected. Below is a sample listing of important demographic data that can be important in a death investigation:

- Full name of decedent, including at least the middle initial
- Maiden name (if applicable)
- Sex, race, age, and date of birth
- Social security number (for future social security fraud investigations)
- Address of residence, including city, state, and zip code
- Marital status: single (never married), married, divorced, and widowed
- Home phone and/or cell phone number
- Next-of-kin contact: relationship to deceased, name, address, and telephone number
- Date, location, and time of notification of next-of-kin and by whom
- Employment history; position, name, address, telephone number of company, supervisor's name, and current status (retired, employed, laid off)

No two death investigations will be exactly alike, but all have similar steps that are taken during the initial call, investigation, and resolution. These steps are as follows.

Discovery of Deceased

Determine who made the call and how your agency was contacted.

1. Intake — initial contact:
 - Determine depth of agency involvement (can vary from phone interview to scene visit).
 - Establish phone contact with the scene.
 - Determine jurisdiction.
 - Determine the scope of your agency's responsibility.
 - Do other agencies need to be notified? (e.g., the National Transportation Safety Board [NTSB], Occupational Safety and Health Administration [OSHA], etc.)
2. Information gathering:
 - Identify potential health hazards at the scene (e.g., carbon monoxide [CO], explosions, electrical).
 - Determine the circumstances of death (the story leading up to the death).
 - Collect demographic data, death event data, medical history, criminal history.

- Speak to family, first responders, medical providers, and witnesses.
 - Coordinate with evidence technicians in crime scene cases.
3. Initial assessment at the scene:
 - Secure the scene and establish a perimeter.
 - Identify the law enforcement officer in charge (if any).
 - What is the working cause and manner of death?
 - Will an autopsy be needed?
 - Are any additional experts needed at the scene or at the autopsy?
 4. Examination of the body, the most important evidence at the scene:
 - Obtain photographic documentation.
 - Obtain a scene diagram.
 - Note scene temperature and conditions.
 - Assess the signs of death: rigor, algor, and livor mortis, and decomposition.
 - Package the body and transport.
 - Postmortem examination, including autopsy.
 5. Follow-up information:
 - Toxicology.
 - Autopsy report.
 - Final law enforcement reports.
 - Further investigation.
 6. Final report and disposition of case
 7. Depositions and trial

Statutory Responsibilities

The medical examiner/coroner (MEC) has the statutory responsibility and legal responsibility to determine the cause and manner of death. At most death scenes, because they are natural deaths, this means the MEC has authority and control of the death scene, especially the body. At scenes where law enforcement is present, the scene usually belongs to that agency, but the body is the responsibility of the MEC. At times, especially in high-profile cases and/or homicides, other agencies such as law enforcement and the prosecutor/district attorney will be very interested in collecting evidence if a crime has been committed. Law enforcement usually has control of the scene and evidence.

It is very important that all agencies work together in these situations because there is a common goal, namely that of discovering the facts of the death and the alleged crime. The death scene investigator (DSI) should find and identify himself or herself to the law enforcement personnel in charge. If the MEC clearly has jurisdiction but there is a dispute, it can be useful for the DSI to carry a copy of the appropriate statute to demonstrate authority to those persons doubting it.

Confirm or Validate the Death

Before the death investigation can begin, the death must be officially confirmed. If any signs of life are seen by the first responders, the body will likely not be at the scene and death will be pronounced at the medical facility. In some cases, emergency services will have checked for signs of life and already confirmed the death. Authority to pronounce death varies by state laws. Typically, a physician, MEC, or nurse (under a physician's direction)

- [read online Kaz the Minotaur \(Dragonlance: Heroes II, Book 1\) here](#)
- [Elephant Girl: A Human Story pdf](#)
- [Health Economics: Theory, Insights, and Industry Studies \(6th Edition\) for free](#)
- [A Train of Powder pdf, azw \(kindle\), epub, doc, mobi](#)
- [read online Canon EOS 60D From Snapshots to Great Shots pdf, azw \(kindle\)](#)
- [read Bartlett's Familiar Quotations](#)

- <http://damianfoster.com/books/Art-of-Everyday-Photography-Companion--Quick-Tips-for-Shooting-and-Photo-Editing.pdf>
- <http://schroff.de/books/The-Odd-Women--Oxford-World-s-Classics-.pdf>
- <http://academialanguagebar.com/?ebooks/A-History-of-Air-Warfare.pdf>
- <http://dadhoc.com/lib/The-Floating-Lady-Murder---Harry-Houdini-Mysteries--Book-2-.pdf>
- <http://thermco.pl/library/Lake-Minnetonka--Images-of-America-.pdf>
- <http://jaythebody.com/freebooks/The-Dig-Official-Player-s-Guide.pdf>