The Ins and Outs of Death Certification: Understanding the Challenges of Determining Why Someone Died

NorthEast Home Office Underwriters Association
November 10, 2013

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MEDICOLEGAL INVESTIGATION OF DEATH

- **CORONER**
  - Locally elected physician or non-physician

- **MEDICAL EXAMINER**
  - Physician appointed by the Chief Medical Examiner

- **FORENSIC PATHOLOGIST**
  - Medical examiner with specialized training in forensic pathology
Purpose of Medical Legal Death investigation

- determine Cause of death and Manner of death
- identify deceased if unknown
- collect evidence from the body
- document injuries or lack of injuries
- deduce how the injuries occurred
- document any natural disease present
- determine or exclude other contributory or causative factors to the death
CASE INTAKE

- reported 24/7/365
  - on-call physician/investigator

- case transport
  - OCME technicians
  - funeral homes
Reportable Cases
Cases to be Reported

- All fatalities which are not entirely due to natural causes despite time interval
  - Accidents
  - Homicides
  - Suicides
  - Therapeutic complications
- Fatalities of children <18 yrs of age
- Fatalities in penal institutions and mental health institutions
- Sudden and unexpected fatalities
- Fatalities without a physician in attendance
- Fatalities due to acute or chronic use of drugs or alcohol
- Fatalities related to occupational illness or injury
- Fatalities following an unlawful abortion
- Fatalities within 24hrs of admission to hospital or during or following a procedure*
- Skeletal remains
- Fatalities in any public or private conveyance
- Fetal deaths of ≥20 wks gest. or ≥350gm or stillborns
- Unidentified or unclaimed bodies (decomposed bodies)
- All sudden deaths not caused by readily recognizable disease, or where cause of death cannot be certified by a treating physician
- Any time there is uncertainty about if a case should be reported
IF TRAUMA CONTRIBUTES IN ANY WAY TO THE CAUSE OF DEATH, THE DEATH MUST BE REPORTED TO THE MEDICAL EXAMNER’S OFFICE

* Reported cases need not be accepted by the ME/ Coroner
Section 3. It shall be the duty of any person having knowledge of a death which occurs under the circumstances enumerated in this paragraph immediately to notify the office of the chief medical examiner, or the medical examiner designated to the location where the death has occurred, of the known facts concerning the time, place, manner, circumstances and cause of such death:

(12) sudden death when the decedent was in apparent good health;

(16) death of children under the age of 18 years from any cause;
SCENE INVESTIGATION

- Local Police
- State Police
- Medical examiner/Coroner
- Medicolegal investigators
ADDITIONAL INFORMATION

- Scene photos
- Security camera tapes
- Video-taped witness interviews
- Written copies of witness interviews
- Medical records
- Family interviews
- Physician interviews
- Cremation authorization
  - Standardization
  - Financial
CASES-MASSACHUSETTS

- ~5500 / year
  - 42% natural
  - 35% accident
  - 10% suicide
  - 3% homicide
  - 3% therapeutic complication
  - 3% undetermined
AUTOPSY

- “post mortem surgical procedure”
  - Hospital pathologist
  - Forensic pathologist
- Multiple purposes for multiple people
  - Family
  - Physicians
  - Public health
  - Settlement of estate
- **GOLD STANDARD**
Value of Autopsy to Family

- Answer why a loved one died (cause of death)
- Documents medical conditions
  - Known and unknown
  - Potential medical impact for surviving family
- Clarifies potential medicolegal issues surrounding death
- Settlement of estate
  - Bank accounts, life insurance, benefits for family members, sale of property, possession of decedents property
- Emotional “closure” (dealing with grief)
- Medical information may help surviving family members (e.g. contagious diseases, inheritable diseases, diseases w/increased genetic risk)
- Provide information for insurance and death benefits (e.g. occupational illness)
- Medicolegal issues
Value of Autopsy to Physician

- Determines cause of death
- Detects diagnostic errors
- Assesses validity of new diagnostic and therapeutic modalities
- Provides new data on new and old diseases
- Clarifies potential medicolegal issues surrounding death
AUTOPSY

- Hospital autopsies
  - NATURAL
- Forensic (Medicolegal) autopsies
  - SUDDEN
  - UNEXPECTED
  - UN-NATURAL
    - HOMICIDE
    - SUICIDE
    - ACCIDENT
    - THERAPEUTIC COMPLICATION*
    - UNDETERMINED
Hospital Autopsy

- Consent from legal next of kin
  - Autopsy
  - Retention of organs or tissues
  - Special testing (i.e. genetics, toxicology)
- Brain and organs retained for teaching conferences
- Extensive histology
Forensic Autopsy

- No consent necessary
- Small pieces of organs retained (stock jar)
- Whole organs retained if necessary (brain, heart)
- Toxicology typical (qualitative and quantitative)
- Limited histology
Order of Relationship (legal next-of-kin)

1. Surviving spouse
2. Adult child
3. Adult grandchild
4. Parents
5. Sibling
6. Nephew or niece
7. Grandparent
8. Uncle or aunt
9. Cousin
10. Stepchild
11. Relative of previously deceased spouse
12. Any other relative or friend who assumes custody of body for burial
Myths/Misconceptions about Autopsies

- Deceased has “suffered enough”
- Religious objections
- Body will be disfigured/mutilated
- Clinical diagnosis is excellent and technology is infallible
- Autopsy takes a long time and delays funeral arrangements
- It’s “too late” to do anything positive
- Patient’s family will have to pay for autopsy
Medical profession’s attitudes

- Everything about the deceased is known
- Pathologists have low interest
- Fear of “being wrong”
- Fear of litigation
- Pathologists lack financial incentive
- JCAHO requirement not in place
- Pathologist’s fear of catching infectious diseases
- Medical students/residents poorly educated about autopsy procedure
Medical Techniques have advanced greatly and we can basically make diagnosis from things like MRI, CT scan, blood tests etc...why perform autopsies...they aren't really necessary, are they?

10-41% incidence of major discrepancies between clinical diagnoses (incl. those listed on death certificates) and diagnoses found at autopsy
The Autopsy

- Internal Examination
- External Examination
Types of Autopsy

- Unlimited
- Limited
  - Limited to specific organs
  - Organs returned to body
  - In situ exam (w/ or w/o tissue sampling)
  - Religious objections
The Autopsy – External Examination

- General features of body
- Algor mortis – Cooling of the body
- Rigor mortis - Stiffening of the body
- Livor Mortis – Pooling of the blood with gravity
Internal Examination:
Organs Removed at Autopsy

- Heart
- Lungs
- Liver
- Spleen
- Small and Large Intestines
- Adrenal glands
- Kidneys
- Pelvic organs (genital organs, bladder, rectum)
- Stomach, esophagus and pancreas
- Brain
- Neck
Other

- Photographs
- X-rays
- Toxicology
  - Blood, bile, urine, vitreous humor, gastric contents, tissues
- Histology
  - Heart, lungs, liver, kidney
- Stock jar
- Genetics
  - Blood, tissues
- Microbiology
- Evidence
  - Hair, fingernails, blood, sexual assault kit, bullets, knives, swabs, clothing, foreign material
DETERMINE THE CAUSE AND MANNER OF DEATH IN VIOLENT, UNEXPECTED OR SUSPICIOUS DEATHS

INVESTIGATE + REPORT DEATHS DUE TO COMMUNICABLE DISEASES TO DEPT OF HEALTH

INVESTIGATE + REPORT FATAL CASES OF CHILD ABUSE TO CHILD SERVICES

INVESTIGATE + REPORT FATAL ACCIDENTS AT WORK TO OSHA

INVESTIGATE + REPORT FATAL CASES OF ELDER ABUSE

IDENTIFY HUMAN REMAINS

COURT TESTIMONY
Death Certification-Cause

- Disease or injury, or combination, responsible for initiating the lethal sequence of events

- Ex.
  - Gunshot wound of head.
  - Hypertensive and Atherosclerotic cardiovascular disease.
  - Metastatic adenocarcinoma of the colon
Death certification - Manner

- Explanation of how the cause of death arose
  - Natural
  - Homicide
  - Suicide
  - Accident
  - Therapeutic complication*
  - Undetermined

- Opinion based on facts concerning the circumstances of death in conjunction with autopsy findings

- Does not determine legal implications & consequences
What does a pending death certificate mean?

- Waiting for more information on a case, which can include some or many of the following:
  - Medical records
  - Toxicology
  - Genetics
  - Speak to family
  - Histology
  - Police information
  - Details of an injury
CAUSE OF DEATH (See instructions and examples)

32. PART I. Enter the chain of events—diseases, injuries, or complications—that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.

IMMEDIATE CAUSE (Final disease or condition resulting in death)

a. ___________________________________________________________________________
   Due to (or as a consequence of):
   ___________________________________________________________________________
   Approximate Interval:
   Onset to death

Sequentially list conditions, if any, leading to the cause listed on line a. Enter the
UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST

b. ___________________________________________________________________________
   Due to (or as a consequence of):
   ___________________________________________________________________________

c. ___________________________________________________________________________
   Due to (or as a consequence of):
   ___________________________________________________________________________

d. ___________________________________________________________________________
   Due to (or as a consequence of):
   ___________________________________________________________________________

PART II. Enter other significant conditions contributing to death but not resulting in the underlying cause given in PART I

33. WAS AN AUTOPSY PERFORMED? □ Yes □ No

34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? □ Yes □ No
Death Certification- All You Ever Wanted to Know

- **Who** can certify deaths?
- **What** does it mean to certify deaths?
- **When** is it appropriate to certify deaths?
- **How** should a death certificate be filled?
- **Why** do we need death certification?
Why do we certify deaths?

- Regulation of the disposal of remains
- Vital records, statistics, research, public health, safety
- Estate management, life insurance, debt settlement
“Certifier” is the physician, medical examiner, or coroner who completes the cause of death section of the death certificate and signs the certificate to indicate that the cause of death, to the best of his or her knowledge, is accurate. The cause of death listed by the certifier is the certifier’s best. It is the certifier’s duty to indicate a cause of death as accurately and as possible, and every effort should be made to base the cause of death on all information available from medical records, the attending and pronouncing physicians, and other sources.
Who can Certify?

- Physician who cared for the decedent and has knowledge of the patient's medical history and cause of death
  - Solely natural causes.

- Medical examiner or coroner who investigated when death is due to non-natural cause, is sudden and unexplained, is suspicious or unusual, when no physician who can certify the death, special circumstances (i.e. custody cases, police shootings).

- Autopsy pathologist (hospital)
Background

- **WHO**
  - produces standards for collection and classification of mortality for international comparison.

- **National Center for Health Statistics (NCHS)**
  - Part of CDC.
  - Collection and analysis of mortality data in the US.
  - Periodic revision of US Standard Certificate of Death
  - Provide funds to states for data in exchange for usage of a standard format.
  - Each state has vital statistic regulations requiring completion of death certificate.
Cause of death

- underlying, proximate or primary cause of death:
  - “the disease or injury which, in a natural and continuous sequence unbroken by any efficient intervening cause, produces the fatality and without which death would not have occurred.”
Cause of Death

The disease or injury responsible for death

- **Proximate Cause /Underlying Cause of Death:** That which in a natural and continuous sequence, unbroken by any efficient intervening cause, produces the end result and without which the end result would not have occurred. (etiologically specific)

- **Immediate Cause:** The terminal events leading to death (not etiologically specific)

- **Mechanism of Death:** The physiologic or biochemical derangements leading to death (not etiologically specific)
Death Certification-Cause

- Disease or injury, or combination, responsible for initiating the lethal sequence of events

- Must be etiologically specific

- Ex.
  - Gunshot wound of head.
  - Hypertensive and Atherosclerotic cardiovascular disease.
  - Metastatic adenocarcinoma of the colon.
Proximate:
- Underlying cause of death
- That which in a natural and continuous, unbroken sequence produces fatality and without which death would not have occurred
  - Ex. Gun shot wound of abdomen

Immediate:
- Complications and sequelae of the proximate cause which may be multiple but does not override the responsibility of the proximate cause
- Does not have to have a direct temporal relationship.
  - Ex. Peritonitis, sepsis, acute bronchopneumonia
Cause of death

- immediate cause:
  - complications and sequelae of underlying cause, e.g. the disease, injury or complication directly preceding death or the last event that occurred before death
  - immediate causes may be multiple but none absolves the underlying cause
Contributory Causes (Part II.)

- For causes of death which contribute to the death of the person, but are distinct from the primary cause of death.
- May also be used to help explain the primary cause of death when alone it does not tell the full story.
- **Not** for a listing of all other arbitrary medical conditions or unusual findings.
Cause Of Death

- **Must be** on the death certificate
  - **Underlying cause** of death, eg. Gunshot wound of spine, Hypertensive Cardiovascular Disease, Asthma

- **May be** on the death certificate accompanying the underlying cause
  - **Immediate cause** of death, eg. Bronchopneumonia, sepsis

- **Should not** be on the death certificate:
  - **Mechanism of death**, eg. Asystole, Cardiorespiratory arrest, Cardiopulmonary arrest
Immediate Cause of Death

- Sequelae of the underlying cause which are temporally related to death but not the underlying cause.
- Due to what?
- Examples:
  - Sepsis
  - Bronchopneumonia
  - Multi-organ Failure
  - Cirrhosis
  - Disseminated Intravascular Coagulation
The Proximate Cause

- “The heart of the matter”
- Not time dependent
- The **underlying** cause of death is **required** on the death certificate

**Examples**
- Hypertensive Cardiovascular Disease
- Bronchial Asthma
- Gunshot Wound of Head
- Acute Cocaine Intoxication
Mechanism of death

- physiologic derangement or biochemical disturbance that is incompatible with life and is initiated by the cause of death; should not appear on death certificate

- examples:
  - ventricular fibrillation
  - respiratory arrest
  - exsanguination
  - asphyxia
Mechanism of Death

- The physiologic/biochemical derangement leading to death
- Not etiologically specific
- Examples
  - Cardiac Arrhythmia
  - Exsanguination
  - Respiratory failure
  - Cardio-respiratory arrest
Death certification: Mechanism

- Altered physiology and biochemistry whereby the cause of death exerts its lethal effects

- Not etiologically specific
  - Can not be used as competent causes of death.

- Interchangeable with immediate cause

- Ex.
  - Cardiopulmonary arrest
  - Cardiac arrhythmia
  - Multiorgan failure
  - Exanguination
  - Asphyxia
  - Sepsis
  - Hyperglycemia
# The Death Certificate

**DATE FILED**

**THE CITY OF NEW YORK - DEPARTMENT OF HEALTH AND MENTAL HYGIENE**

**CERTIFICATE OF DEATH**

1. **DECEDEENT'S LEGAL NAME**
   - (First Name)  
   - (Middle Name)

<table>
<thead>
<tr>
<th>Place Of Death</th>
<th>Type of Place</th>
<th>Name of hospital or other facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a New York City</td>
<td>2c Hospital Inpatient</td>
<td>2d Name of hospital or other facility</td>
</tr>
<tr>
<td>2b Borough</td>
<td>2e Emergency Dept/Outpatient</td>
<td>2f Decedent's Residence</td>
</tr>
<tr>
<td>2g Dead on Arrival</td>
<td>2h Other Specify</td>
<td></td>
</tr>
</tbody>
</table>

2. **Date and Time of Death or Found Dead**
   - 3a Month  
   - 3b Day  
   - 3c Year-yyyy  
   - 3d Time  
   - 3e AM/PM

3. **Sex**
   - 4a Male  
   - 4b Female

6. **CAUSE OF DEATH**
   - **PART I**
     - a. Immediate cause
     - b. Due to or as a consequence of
     - c. Due to or as a consequence of

   - **PART II**
     - Other significant conditions contributing to death but not resulting in the underlying cause given in Part I. Include operation information.

7. **INJURY DATE**
   - 7a Injury Date mm dd yyyy  
   - 7b Time AM/PM

8. **MANNER OF DEATH**
   - Driver/Operator  
   - Passenger  
   - Other Specify

9. **Autopsy**
   - Yes  
   - No

10. **On the basis of examination and/or investigation the causes and manner as stated**

**Certifier Signature**

**Certifier Name (Print)**

**DOHMH USE ONLY**

**DEPARTMENT OF HEALTH AND MENTAL HYGIENE**

**MEDICAL CERTIFICATE OF DEATH**

- **Injury Date**
- **Place of Injury**
- **At Work**
- **Yes/No**
- **Location**

**How Injury Occurred**

- **Transportation Injury**
- **Driver/Operator**
- **Passenger**
- **Other Specify**

**Manner of Death**

- **Suicide**
- **Homicide**
- **Natural**
- **Pending further study**
- **Accident**
- **Undetermined**

**Certifier Signature**

**Certifier Name (Print)**
**IA: Immediate cause of death:**
- Condition that was last to occur, immediately resulted in the death, and was the result of the underlying cause of death
  - Ex. IA: Immediate cause of death
    - Hemopericardium
  - Should not included terminal events/mechanisms
  - Ex. Cardiopulmonary arrest
### Cause: Part IB-D

- **IB-D**: Underlying causes

- **Sequential list of conditions, if any, that lead to the immediate cause of death (Part IA).**
  - **Ex. IA**: Immediate cause of death
    - **Hemopericardium**
    - **IB**: Due to or a consequence of
      - ruptured aortic aneurysm
    - **IC**: Due to or a consequence of
      - atherosclerotic cardiovascular disease
Cause: Part II

- Part II: Other significant conditions
  - Significant conditions contributing to death, but not resulting in any cause given in Part I
    - Ex. IA: Immediate cause of death
      - Hemopericardium
    - IB: Due to or a consequence of
      - ruptured myocardial infarct
    - IC: Due to or a consequence of
      - atherosclerotic cardiovascular disease
  - II: Other significant conditions
    - Obesity, Diabetes Mellitus
“7F”: Accidents, Homicides & Suicides

- “7f:” Description of how injury occurred
  - Ex.
    - Stabbed and beaten by other(s)
    - Submerged self in tub of water
    - Structural fire
Death certification- Manner

- Explanation of how the cause of death arose.
  - Natural
  - Homicide
  - Suicide
  - Accident
  - Therapeutic complication*
  - Undetermined

- Opinion based on facts concerning the circumstances of death in conjunction with autopsy findings

- Does not determine legal implications & consequences
Natural Deaths

- Death results solely from disease and/or aging process, and no external or intervening causes contributed to death.

- Any contribution of
  - Therapy
  - Injury (Physical or Chemical)
  = Unnatural Death

- Ex. Atherosclerotic cardiovascular disease.

**Chronic Alcoholism and Chronic Substance Abuse are diseases classified as natural**
Unnatural Deaths

- Violent Deaths
  - Suicide
  - Accident
  - Homicide

- Therapeutic Complication
- Undetermined
Suicide

- Self inflicted act meant to cause ones own death

- Largest burden of proof
  - Suicide notes, verbal expressions of suicidal ideations, plans
  - Previous suicide attempts

- Ex. Blunt impacts of head, torso and extremities with fractures and visceral injuries
  - 7f: Jumped from height
Accident

- Unintentional death resulting from injury or poisoning and is unforeseen and not predictable as to time and place of occurrence.

- Significant intervening cause interrupting natural disease and aging.

- Ex. Blunt impacts of head torso and extremities with fractures and visceral injuries.
  - 7f: pedestrian struck by motor vehicle

- Accidents in the workplace should be reported to OSHA
- All traffic fatalities are classified as accidents except when the vehicle is being used as a weapon or in the commission of a crime
Homicide

- Death at the hands of another
  - Violent, negligent or criminal actions
- Proof of intent is not necessary
- Is not synonymous with murder
- Ex. Gunshot wound of head
  - 7f: Shot by other(s)
Therapeutic complication

- Predictable consequences or complications of acceptable and appropriate medical therapy contribute to death

- Neither accidents nor natural

- Not equivalent to malpractice
  - Medical/Therapeutic misadventure

- Must contain complication, procedure and underlying disease.

- Ex. Hemopericardium due to perforation of left anterior descending coronary artery during cardiac catheterization for the treatment of atherosclerotic cardiovascular disease.
Manner- Undetermined

- When the options of investigation are exhausted and the circumstances remain unclear or two or more equally plausible possible circumstances exist

- Ex. Drowning
  - 7f: Unknown

- Circumstances: 35 year old woman found floating in the river, moderately decomposed, with no signs of trauma, and post mortem toxicology positive for ethanol and morphine.
Common Mistakes in Death Certification

- Absence of the proximate cause
- Proximate cause and immediate cause are in reverse order
- Inappropriate use of Part II
- Misspelling
- Abbreviations
Case Examples
Case 1

- A 42 year old man with chronic alcoholism was found dead at home. Autopsy discloses fatty cirrhosis of the liver and 0.35% ethanol.
Cause: Acute and Chronic Alcoholism

Manner: Natural
An 18 year old man drank a quart of vodka to win a bet with friends. Several hours later he was found dead in a chair. Autopsy disclosed visceral congestion with pulmonary edema and his blood contained 0.48% ethanol.
Cause: Acute Ethanol Intoxication

Manner: Accident
Case 3

A 55 year old man with no known medical history was found dead at home. Autopsy disclosed hemopericardium with tamponade due to a ruptured dissecting aortic aneurysm. The heart weighed 620 grams and had a 2.0 cm thick left ventricular wall. The kidneys had moderate arterial and arteriolar nephrosclerosis
Cause: Hemopericardium with tamponade due to dissecting aortic aneurysm due to Hypertensive cardiovascular disease

Manner: Natural
Case 3 - Comparison Case

- 84 y/o man presents to hospital complaining of pain and weakness in his legs. Upon evaluation in hospital, he was found to have an aortic dissection. He admitted to physicians that he had snorted 1 g of cocaine that evening and his symptoms had begin shortly thereafter.

- Toxicology:
  - Cocaine 26 ng/mL
  - Benzoylecognine 948 ng/mL

- COD: Acute aortic dissection following insufflation of cocaine
- MOD: ACCIDENT
Case 4

A 40 year old man with AIDS died from PCP pneumonia. In 1981 he was the victim of an armed robbery and shooting. His treatment at the time included multiple blood transfusions. He had no other known risk factor for exposure to HIV.
Cause: Pneumocystis Carinii pneumonia complicating AIDS/HIV due to contaminated blood products administered for treatment of gunshot wound

Manner: Homicide
Case 5

A 65 year old woman was admitted to the hospital with congestive heart failure due to hypertensive cardiovascular disease and diabetes mellitus. Her attending physician prescribed digitalis and wrote appropriate orders. The nurse misread the doctor’s order and administered 10 times the prescribed dose. The patient developed digitalis intoxication and died.
Cause: Digitalis intoxication due to overdose of digitalis during treatment of congestive heart failure due to hypertensive cardiovascular disease

Part II  Diabetes Mellitus

Manner:  Accident
A 72 year old man with degenerative calcific aortic stenosis underwent valve replacement following successful treatment of a bout of congestive heart failure. The operative procedure was uneventful until its conclusion when the patient could not be weaned from the pump. Autopsy disclosed an intact prosthetic aortic valve, no mechanical complication of surgery and a 760 gram fibrotic heart with a markedly hypertrophied left ventricle.
Cause: Intraoperative death following prosthetic replacement of aortic valve for the treatment of degenerative calcific aortic stenosis

Manner: Natural or Therapeutic complication
Case 7

- 45 year old woman with a past medical history of hypertension, diabetes, severe depression and lye ingestion at 15 years of age dies of metastatic esophageal carcinoma.
- Cause: Metastatic adenocarcinoma of the esophagus due to remote lye ingestion

- Manner: Suicide
Case 8

- 25 y/o male in MVC, sustains devastating injuries of head, torso and extremities
- Toxicology:
  - 0.17 g% ethanol
- Cause: Blunt force trauma of head, torso and extremities
- Manner: Accident
Case 8 - Comparison Case

- 32 y/o man swallows drug packets when pulled over by the police for a routine traffic stop. He later arrives at a friend’s house, frothing at the mouth, collapses and dies.

- Toxicology:
  - Cocaine and 6-acetylmorphine present in blood

- COD: Acute intoxication due to the combined effects of cocaine and heroin

- MOD: Accident
Case 9

- 43 y/o man found sitting inside a rental car in his garage. The car is running and a tube is connected to the exhaust pipe and the other end enters the car through a space in the side window. He was supposed to testify in Federal court the day he is found.

- Toxicology:
  - Cocaine 691 ng/mL
  - Benzoylecgonine >1000 ng/mL
  - Carboxyhemaglobin 62%
- **Cause:** Asphyxia due to displacement of oxygen by carbon monoxide

- **Manner:** Suicide
Case 10

- 53 y/o electrician working on a breaker box found on floor near box with electrical burns on hands
  - Toxicology:
    - Cocaine 75 ng/mL
    - Benzoylecognine 307 ng/mL
- Cause: Electrocution
- Manner: Accident
Case 11

- 25 y/o male is stabbed 20 times by an unknown assailant
  - Toxicology
    - Ethanol 0.23 g%
    - Cocaine <25 ng/mL and Benzoylecognine <25 ng/mL
    - Morphine <20 ng/mL
    - Carboxy THC 1.5 ng/mL
- Cause: Stab wounds of torso and extremities
- Manner: Homicide
Difficult Cases to Classify

- Autoerotic asphyxia
- Russian-roulette
- Police restraint
- Hit & run
- DUI
- Homicide by heart attack
- SIDS
- Delayed homicides, accidents and suicides
Summary-Death Certification

- Certification of death is the process by which a cause and manner of death are determined.

- Cause of death is the final derangement of function that lead to death:
  - Preference is given to non-natural causes.

- Manner of death is the circumstance by which the cause of death arose:
  - Natural deaths must have an uninterrupted sequence of events.
  - Think “but for”

- Mechanisms of death are terminal events, or anatomic or physiologic derangement.

- Death certificates can be amended.