Forensic Pathology & Death Investigation in Arizona

Arizona Society of Pathologists
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Overview

- Purpose of it all
- Brief history of death investigation in US
  - Coroner, Medical Examiner, Forensic Pathologist
  - Death investigation systems
- Arizona death investigation
- Statistics – Cause & Manner of Death
- Interaction with LE
- Examples
Purpose of the Medical Examiner’s Office

- Determines cause and manner of death of decedents that fall under jurisdiction of ME

Types of deaths that require reporting
- Death when not under current care of a physician
- Violence
- Sudden and unexpected
- Threat to public health
- Prisoner or in a prison
- Suspicious, unusual, unnatural
- Related to occupation
- Related to medical procedure
- Unidentified
Purpose of the Medical Examiner’s Office

- Public health
  - Report deaths due to communicable disease
  - Authorize cremation
  - Tissue and organ donation
  - Vital statistics

- Assist families
  - Answer questions
  - Timely death certification for funeral arrangements
Purpose of the Medical Examiner’s Office

- Aid justice system
- Collect evidence
- Testify
- Interpret injury
- Estimate postmortem interval
What’s The Difference?

- Coroner
- Medical Examiner
- Forensic Pathologist
Coroner

- Often elected, term limit
- Qualification specified by local law
- May not have any medical background
- Concept from England
- Minimal practical modern use
Medical Examiner

- Often appointed by government without term limit
- Often a physician (can be any kind)
  - May be appointed non-physician
- May not be a Forensic Pathologist
Forensic Pathologist

- Physician (pathologist)
- Additional training in forensics
- Work in larger population centers
- Criminal case work and testimony
Some counties have a medical examiner and many or most have a coroner.

State Medical Examiner with coroners in each county

State Medical Examiner with various types of non-coroner regional or local assistance

State Medical Examiner assisting coroners in most counties, at least one autonomous county medical examiner

District Medical Examiners (FL).

Mostly state-funded district offices assisting coroners in most counties (AL).

Medical Examiner (physician) in each county.

Coroner in each county

Regional offices administratively (but not operationally) overseen by person with title of State Medical Examiner (NJ, TN)
Arizona

- 9 Counties in Arizona run a Forensic Pathologist managed death investigation system
- Medical Examiner = Forensic Pathologist
- Alternate Medical Examiner = Non-FP physician
- No coroners in Arizona, only ME’s and alternate ME’s
Total Cases 2004 - 2013

- Pima County
- All Counties
Cause vs Manner of Death

- **Cause**
  - Blunt force injury
  - Coronary artery disease
  - Diabetes
  - Hanging
  - Gunshot wound
  - Overdose
  - Emphysema
  - etc

- **Manner**
  - Homicide
  - Suicide
  - Natural
  - Accident
  - Undetermined
MANNER OF DEATH - 2013

- Natural: 39% (843 cases)
- Accident: 36% (910 cases)
- Suicide: 12% (180 cases)
- Undetermined: 8% (123 cases)
- Homicide: 5% (270 cases)
Homicide by Cause - 2013

- Firearms: 62% (76 cases)
- Sharp Force: 15% (18 cases)
- Blunt Force: 15% (19 cases)
- Other: 8% (10 cases)
Accident by Cause - 2013

- Overdose: 283 (34%)
- Blunt Force Trauma: 231 (27%)
- Motor Vehicle Accident: 197 (23%)
- Exposure To Elements: 64 (8%)
- Drowning: 23 (3%)
- Asphyxia: 14 (2%)
- Fire Deaths: 13 (2%)
- Other: 18 (2%)
Suicide by Cause - 2013

- Firearms - 53%
- Hanging - 27%
- Overdose - 12%
- Asphyxia - 3%
- Other - 4%

Total: 144
Natural Deaths by Cause - 2013

- Cardiovascular Disease: 64%
- Sequelae of Chronic Alcohol Abuse: 8%
- Pulmonary Disease: 6%
- Infectious Disease: 5%
- Diabetes Mellitus: 4%
- Malignancy: 4%
- Other: 9%
Overdose Deaths 2010 - 2013

- 2010: 273
- 2011: 277
- 2012: 314
- 2013: 327
Select Drugs by Year 2011-2013

- Oxycodone
- Morphine
- Alcohol
- Methamphetamine
- Heroin
- Cocaine

2011:
- Oxycodone: 53
- Morphine: 42
- Alcohol: 22
- Methamphetamine: 40
- Heroin: 37
- Cocaine: 38

2012:
- Oxycodone: 76
- Morphine: 66
- Alcohol: 38
- Methamphetamine: 38
- Heroin: 36
- Cocaine: 39

2013:
- Oxycodone: 55
- Morphine: 64
- Alcohol: 59
- Methamphetamine: 78
- Heroin: 53
- Cocaine: 34
ME and the Judicial System

- Frequently consulted in criminal prosecution and civil litigation
- Most criminal investigations involve homicides followed by accidents (MVA)
- Most commonly called to testify by the prosecution as neutral expert witness
- Guilt is determined by the court
What information we provide

- Estimate postmortem interval
- Document and characterize injury
  - Firearms, Sharp force, Blunt force, Asphyxia, etc
- Presence/absence of natural disease or other conditions
- Survivability
- Distinguish between artifact and injury
- Collect evidence
Components of Examination

- Review of information
  - Scene, demographic, medical history, comments from law enforcement, families, others
- External Examination
  - Clothing, height, weight, injuries, natural disease, scars, tattoos, medical intervention, evidence collection
- Internal Examination
  - Injuries, natural disease, medical intervention, evidence collection
Components of Examination

- Toxicology
  - Illicit drugs, prescription medications, poisons
- Radiographs
  - Projectiles, dental examination for ID, hardware
- Histology
  - Infections, cancer, natural disease
- Other
  - Cultures, DNA, special tests
Postmortem Interval

- Rigor Mortis
- Livor Mortis
- Algor Mortis
- Amount of decomposition
- VERY environmentally dependent
- Last seen alive
- Mail, paper, cell phone, etc
Postmortem Change Questions

- Are the finding consistent with story “X”?
- Postmortem movement of the body?
- Environment – temperature, air flow, clothing, body habitus, humidity, insect activity, animal scavenging
GSW Questions

- Range of fire?
  - Contact
  - Intermediate
  - Distant

- Entrance/Exit?

- If multiple injuries which is most serious?

- Same weapon?

- Handgun, shotgun, rifle, etc.?
Sharp Force Injury Questions

- Stab or incised wound?
- Length of blade?
- Depth of penetration?
- If multiple wounds which is most serious?
- Direction of wound?
- Sharp or blunt edges?
- Consistent with weapon “X”? 
Blunt Force Injury Questions

- Contusion, abrasion or laceration?
- All injuries same age?
- If multiple which is most serious?
- Consistent with being produced by weapon “X”?
- Pattern to injury?
Natural Death Questions

- Often involve sudden deaths or deaths of individuals who did not see a doctor
  - How did they die?
  - Could I have done something sooner?
  - Does this run in the family?
CHARGE Syndrome

- Coloboma of the eye
- Heart defects
- Atresia of the choanae
- Retardation of growth or development
- Genital/urinary abnormalities
- Ear abnormalities or deafness