

Information Session, Office of the Chief Medical Examiner, Edmonton, March 19, 2005

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*** These notes contain the text from the PowerPoint presentations given.**

Topic One: Sudden Death Investigation in Alberta – General Info

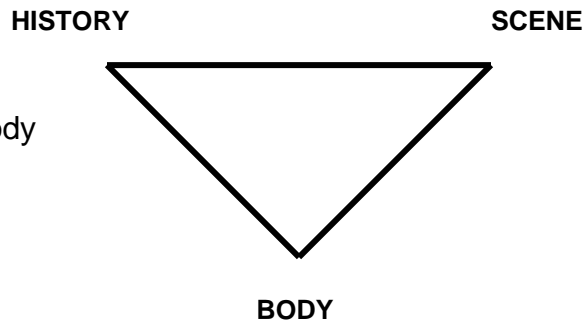
- There are approximately 20,000 deaths per year in the province of Alberta
- 2/3 of deaths are expected, can be explained, and are caused by natural causes
- 1/3 of deaths are unexpected, unexplained, violent or occur when the decedent had no attending physician
- Reasons for Sudden Death Investigations (SDIs):
 - o Rule out criminal activity
 - o Determine the cause of death\determine the manner of death
 - o Determine whether the death was preventable
- Death must be properly certified
 - o To answer civil law concerns (settlement of estate, life insurance)
 - o For statistical purposes
 - o To issue a burial permit
- SDI is a provincial responsibility
- SDI Systems
 - o Coroner's system
 - o Medical examiner's system
 - o Justice of the Peace (U.S.A.)
 - o Continental system
- Coroner's System
 - o Originated in feudal England in +/- 900 A.D.
 - o Many coroners have a medical, legal or investigative background
 - o In some provinces a coroner must be a physician
 - o B.C. Chief Coroner is ex-RCMP
 - o In Ontario they're MDs
 - o Coroner orders a pathologist to conduct an examination of the body (usually an autopsy)
 - o Coroner has the power to call and/or preside over an inquest
- Medical Examiner's System
 - o Originated in Massachusetts in 1877
 - o Alberta switch to the M.E.'s system in 1977 under a new law, the Fatality Inquiries Act
 - o Medical examiner is a physician, but not necessarily a pathologist
 - o All Canadian chief medical examiners are forensic pathologists
 - o Can perform external examination or autopsy
 - o No power to call or preside over a fatality inquiry- usually a provincial judge presides

- A fatality review board is made up of a doctor, a lawyer, and a lay person. The board decides if an inquiry is needed
- In the coroner system, a coroner can preside over a fatality inquiry
- Inquests and Fatality Inquiries
 - Presided over by a coroner or a provincial court judge
 - Judge or jury of six individuals for most coroner's inquests
 - They must determine who died, where, when, why and how
 - Witnesses under oath but are protected from incriminating themselves
 - Judge or jury can make recommendations for preventing similar deaths
 - Cannot make findings of fault
- Canadian Coroner's Systems
 - Yukon
 - NWT
 - Nunavut
 - B.C.
 - Saskatchewan
 - Ontario
 - Quebec
 - New Brunswick
 - PEI
- Canadian Medical Examiner Systems
 - Alberta
 - Manitoba
 - Nova Scotia
 - Newfoundland & Labrador
- Manners of Death
 - Natural: attending physician can sign death certificate. Over 50% of deaths fall under this category.
 - Homicide: about the same amount of deaths as Undetermined
 - Suicide
 - Accident
 - Undetermined: manner of death falls into this category in up to 10% of deaths; cause of death falls into this category in up to 2% of deaths
 - Unclassified
- The ME's office (MEO) reviews all death certificates issued in the province
- Sudden death is defined as a death that occurs within one hour of the onset of symptoms
- Unexpected death is a death which occurs when the individual was in apparent good health
- Reportable deaths
 - Unexplained natural deaths when they were in apparent good health

- Unexpected natural deaths when the decedent appeared to be in good health
 - Natural deaths with no attending physician
 - Violent or unnatural deaths
 - Deaths alleged to be as a result of negligence
 - Deaths in custody
 - Deaths of involuntary patients or wards of the government
 - Occupational deaths
 - Maternal deaths that are peri-natal (within three months of the birth, either mother or child)
 - Deaths that occur within ten days of surgery or because of anaesthetic
- Some rural physicians are trained as MEs but Edmonton and Calgary offices do the autopsies

- The Golden Triangle

- The three key elements of the SDI: history, scene, body



- Who Calls for the ME's Office?
- Hospitals
 - Police (City and RCMP) – MUST call ME's office before they can move bodies
 - Emergency Services
- **Scene Investigation**
- Position of body/objects
 - Signs of struggle: can indicated overdose, assault
 - Security of residence: were doors and windows locked?
 - Cupboards, drawers, trash containers
 - Computer
 - Laundry
 - Odors
 - Newspapers
 - Mail piles up
 - Refrigerator: nutrition, meds, lifestyle
 - All prescription meds are seized
 - Witnesses, neighbours, family
 - Is it criminal or not? If so, it's likely a homicide and MEO will assist police

- If not criminal, investigation done by MEO with assistance from police
- Can be tricky i.e. blood all over a toilet bowl, bed, body could be a homicide or could be an alcoholic who vomited and suffered a rupture
- Police will dust for prints around the body before calling the MEO
- ME's office sees far more bodies than the police do
- Under the Act, the ME's investigator can enter a residence without a warrant, using due diligence, reasonable doubt/expectation, but police cannot enter without a warrant
- Suicide notes are left on computers, Blackberries, PDAs. Also check telephone voice mail – this is accepted based on circumstances, location, etc.
- Wills are accepted unless contested
- Less than half of suicides leave notes
- ME's investigator goes to scenes, not the ME or pathologist

- **Body**

- At the scene
 - Body examination
 - Emesis: vomit contents (blood, fluids, etc.)
 - Petechia: face, eyes, can suggest low oxygen environment or strangulation
 - Animal activity
 - Incontinence
 - Trauma, injuries
 - Time indicators: rigor mortis (stiffening), livor mortis (blood settling), temperature, decomposition
 - Colour: carbon monoxide adheres to red blood cells so skin is very pink after death of asphyxiation. Hypothermia makes skin very pink too. Skin is purple from low oxygen.
- At the MEO: External examination or autopsy
 - Signs of injury
 - Collect blood
 - Usually x-rays are taken (always with children)

- **History**

- Being done while body is being examined
- Manner of death documented by ME's office is an opinion only
- If family wants an autopsy history is important
- Family consent is neither required or sought if ME's office decides to proceed with autopsy
- Hospital Autopsy
 - Can be performed at the request of the attending physician
 - Must have consent of legal next-of-kin

- Cause of death often not an issue
- Oriented to providing detailed description of all visible disease processes
- Conclusions usually based only upon visible autopsy findings
- Autopsy report is part of the patient's hospital record but not released to family – can apply to get it
- Medicolegal Autopsies
 - Autopsy ordered by coroner or ME
 - Does not require consent of legal next-of-kin
 - Determination of cause of death primary purpose of autopsy
 - Conclusions drawn from history, scene, autopsy, toxicology, trace evidence findings
 - Report directly accessible by legal next-of-kin and interested parties

Topic Two: Facility Tour

- At a death scene on a 911 call, EMS does Patient Care Report
- Police are called by EMS
- Police call the ME's investigator
- Scene photos are taken by the Identification Branch (police) and the ME's office
- Edmonton Removal Service moves body from scene to ME's office
- ME's investigator will bag hands with paper bag and apply toe tag before moving body (paper bag because of evaporation/moisture issues)
- Constable will accompany body for continuity, hand off body to ME's office (photo taken of constable and ME to prove hand-off)
- External exam to see if state of body is consistent with cause of death
- Blood, urine, vitreous fluid taken during external exam
- They keep bodies in a cooler at 4 degrees Celsius for up to a couple of weeks
- They only freeze bodies that aren't viewable or that are there a long time
- The cooler holds 50 bodies, has an electric sliding door
- Unclaimed bodies are buried by the Public Trustee, not cremated in case identification is established later
- Regular autopsies take about 35 minutes; homicides take longer
- During the autopsy, the decedent's face is covered out of respect
- They like to have the body to the funeral home in 24 to 48 hours after its arrival at the ME's office
- Weapons come to the ME's office to be sure the weapon could have physically caused the damage
- In Edmonton, Owen Beattie, forensic anthropologist at the U of A is paid to consult on skeletonized remains, body fragments, etc.

- The Edmonton office handles about 3,000 cases each year. Most days 3 to 5 cases
- Summer busier, Christmas busier
- Time of Death Indicators
 - o Body loses warmth (they don't use thermometers at the scene, just by feel)
 - o Rigidity
 - o Lividity – fixed at 12 to 16 hours with no blanching. Earlier than that it's less obvious
 - o Liver and stomach contents are taken at every autopsy
 - o Tissues are put in "stock pots". Kept 6 months, then incinerated
 - o Brains and other organs are fixed in formalin before slicing for microscopic exam
 - o Most often identify people with medical x-rays, not dental
 - o All children under 4 are completely x-rayed
 - o Toxicology lab is just drugs and alcohol (gas chromatographs are \$400,00 each)
 - o Drug levels back in 4 weeks (rush)
 - o DNA results in Canada take a year
 - o Mass specs are about \$1 million each
 - o The media are not entitled to copies of autopsy reports
- Miscellaneous
 - o Fungus, mold will grow in eyes, ears, indicating the person has been dead for a long time.
 - o When skeletal remains are found in winter, the police/ME's investigator will go back to the scene after the thaw to make sure they haven't missed anything
 - o Criteria for death is brain death

Topic Three: Sudden Death Investigation Documentation

- Who can receive the documents?
 - o Next of Kin (NOK) or personal representative
 - Husband/wife (common-law)
 - Son/daughter
 - Mother/father
 - Sister/brother
 - Executor of the estate
 - o Any person authorized in writing by the next of kin
 - o Interested parties
 - insurance companies/banks
 - lawyers
- Requesting Reports
 - o Request must be in writing with appropriate fee enclosed

- Next of Kin letter sent to NOK within one week of the death occurring, includes what documents are available, where they are available and for what fees
- Authorization for Release of Information
 - Sent to the NOK
 - Does not have to be returned unless they require information to be released
- Certificate of Medical Examiner
 - Completed by the ME
 - NOK control release
 - Required by insurance companies, lawyers
- External Examination Report
 - Completed by the medical examiner when an autopsy is not performed
 - Available to NOK and interested parties
 - Required by insurance companies, lawyers
 - Cost: \$15.00
- Summary Autopsy Report
 - Completed by pathologist
 - Available to NOK and interested parties
 - Required by insurance companies and lawyers
 - Cost: \$15.00 per copy
- Toxicology Report
 - Completed by the Toxicologist
 - States the level of drugs and alcohol
 - Available to NOK and interested parties
 - Cost: \$20.00/copy
- Complete Autopsy Report
- Completed by a Pathologist
- Available to Next of Kin, family physician, interested parties, hospitals
- Required by insurance companies, lawyers, sometimes family physician
- Includes summary autopsy and toxicology reports
- Cost: \$40.00/copy
- Medical Examiner's Medical Certificate of Death
 - Completed for Vital Statistics as the official registration of death
 - States the Cause and Manner of Death
 - Available for a fee from any registries office
- Certificate of Death
 - States Name of Deceased, Date of Death, Location of Death (town, city)
 - Does not state cause of death
 - Available from any registries office
 - Fee for each copy requested
 - Accepted as proof of death

Topic Four: Identification and Time of Death

- **Identification Status**
 - o Positive
 - o Tentative – info from scene, body, witnesses
 - o Unidentified – no info about identity
 - o Driver’s license is not good enough for a positive ID
 - o Tattoos can be used
 - o X-rays of vertebrae, pelvis, shoulder joints, sinuses can be used to identify body (many body parts are considered unique)
 - o A toe tag is a legal document and must read ID status

- Positive Identification
 - o Viewing
 - o Fingerprints – AFIS/SPF
 - o Medical/dental x-rays
 - o DNA fingerprinting
 - o Photo video superimposition/reconstruction
 - o Circumstantial
 - o Child Find fingerprints are not considered positive ID because the Child Find database isn’t considered secure and is not accessible to the ME’s office
 - o “Gloving”: the outer layer of skin sloughs in the decomposition process. Prints can be obtained from outer layer or inner layer of skin

- **Time of Death/Postmortem Changes**
 - o Time of Death
 - Sometime between when the person was last seen alive and then found dead, the person died...when?
 - Date of death is when the body is found, regardless of the condition
 - o Body Temperature
 - Published accounts of body temperature relating to time of death – early 1800s
 - 1880 Wilkie-Barman paper calculated mean drop in body temp = 1.6 degrees Fahrenheit per hour
 - 1887 Womack paper concluded that there were many difficulties in determining time of death using body temperature
 - o Problems with Body Temperature
 - Varying ambient temperature
 - Winds/drafts
 - Rain, humidity, snow
 - Body posture
 - Body size and muscle mass

- Exertion prior to death
- Clothing/coverings
- Body fat/insulation
- Original body temperature
- Site and method for obtaining body temperature
- Presence of drugs and alcohol (affects rate of metabolism)
- Nanogram method assumes
 - Naked body with dry surfaces
 - Lying extended on back
 - On thermally indifferent base
 - In still air
 - In surroundings without source of heat radiation
 - Permissible variation of 95%
 - Seldom have circumstances like these!
- Four Phases of Rigor Mortis
 - Note: ATP or Adenosine Triphosphate is a high energy phosphate molecule used to store and release energy for work within the body – AR.
 - 1. Delay Period: after death muscle survives in normal state, remains relaxed till ATP levels drop
 - 2. Onset Period: ATP drops below critical threshold, cross-bridges remain intact and rigidity occurs – reversible + ATP or)2
 - 3. Rigor: rigidity full, lactic acid causes pH to drop which fixes cross-bridging – irreversible
 - 4. Resolution: rigidity disappears – decomposition. Muscle fibres decompose and rigor disappears.
- Rigor Mortis
 - First evident in 2 to 4 hours (onset period)
 - Fully developed in 6 to 12 hours (full rigor)
 - Breaks down in 24 to 36 hours (losing rigor)
 - Actual rate of onset and disappearance depends on numerous factors
 - A sudden fatality such as a gunshot can mean the body instantly clutches a gun or a pen prior to rigor
- Hypostasis/Lividity
 - The settling of blood, which occurs at the cessation of circulatory function, to the gravity dependant areas of the body, with subsequent distension of the capillary bed
 - Pressure points result in blanching
 - Visible from ½ to 4 hours after death
 - Reaches maximum intensity from 8 to 12 hours after death
 - Becomes fixed at 8 – 24 hours after death
- Ocular Changes
 - Corneal filming – minutes to hours
 - Tache Noire – minutes to hours. Drying – only if eye is open
 - Corneal Cloudiness - <2 hours to 12 to 24 hours. Difficult to see colour of eye or to see pupil

- Corneal Opacity – three days after death, looks like a lense – caused by decomposition
- Exophthalmos – eye bulges in socket from gas formation behind it
- Endophthalmus – eyes sink (advanced)
- Vitreous Potassium – blood vessels leak potassium during decomposition
- Decomposition
 - Autolysis – the breakdown of cells and organs from an aseptic chemical process caused by intracellular enzymes
 - Pancreas continues to produce acids, etc. after death
 - Putrefaction – the destruction of tissues by bacteria and fermentation
 - Micro-organisms in body consume food and create gas
 - In the colon: organisms thrive now that they are not held in check by the body's systems. Lower right quadrant of colon, where small colon enters into the large intestine, causes a greenish discoloration of outer skin.
 - Outer tissues are also degrading. As fluids and gases build, body purges – looks like bleeding but the skin is dark.
 - Purging from all orifices
 - Vascular system (veins) appear through skin
 - “Burps” can erupt from mouth, etc. and splatter walls.
 - Wet decomposition – body doesn't mummify except toes, fingers, nose
 - Odor comes with bloating
 - Adipocere – worst smell of any decomp. Forms when body is in wet or damp environment.
 - Postmortem animal and Insect Activity
 - Lots of cockroaches in Edmonton
 - Maggots breathe from their hind ends
 - Maggot eggs look like tiny grains of sand or rice
 - Maggots will follow the optic nerve from the eye to the brain – skull can be opened and be full of maggots

If anyone would like a copy of a handout providing a description of how the ME's office investigates a typical death of an unidentified individual (it's 3 pages), contact me and I can fax it or scan it and send it to you. I also have a one-page handout on the Fatality Inquiries Act.