



Improving Access to Quality Medical Care Webinar Series

Presented by

Southwest Telehealth Resource Center
and the Arizona Telemedicine Program

Welcome

SWTRC region - AZ, UT, CO, NM & NV

Fellow HRSA Telehealth Resource Centers

All other participants from the US & abroad



The **Arizona Telemedicine Program**, the **Southwest Telehealth Resource Center** & **UA's Department of Pathology** welcomes you to this free webinar. The practice & delivery of healthcare is changing, with an emphasis on **improving quality, safety, efficiency, & access to care.**

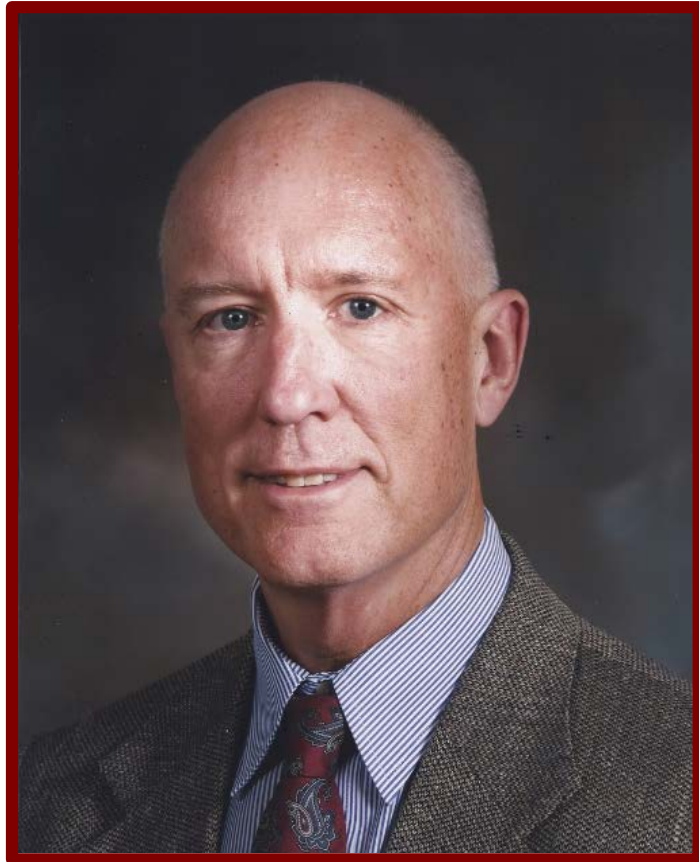
Telemedicine can help you achieve these goals!

Webinar Tips & Notes

- Mute your phone &/or computer microphone
- Time is reserved at the end for Q&A, please use the Chat function to ask questions
- Please fill out the post-webinar survey
- Webinar is being recorded
- Recordings will be posted on the SWTRC website

<http://www.southwesttrc.org>





“Basics of Forensic Pathology”

Bruce Parks, MD
Assistant Professor, Pathology
University of Arizona

DEATH INVESTIGATION IN THE USA

Coroner system

- Oldest type
- Adopted from England dating back to 1200
- Derived from “Crowner”, appointed by King to look out for the interest of the Crown to include holding inquests following deaths
- Governor of Virginia instructed to appoint coroners in 1624
- Physicians involvement solidified in the mid-1800s

DEATH INVESTIGATION IN THE USA

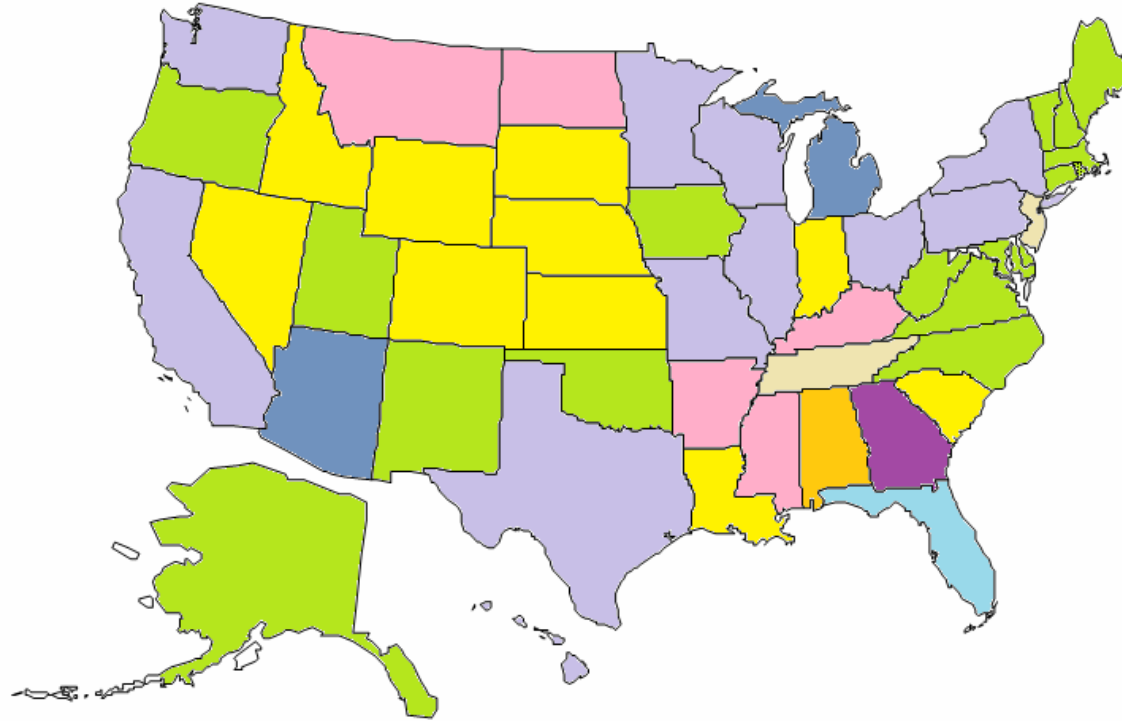
Medical Examiner System

- First medical examiners appointed in 1877 in Massachusetts
- AMA promoted the system in the mid-1900s
- Opposed by coroners
- Considered preferable by the National Institute of Justice (NIJ)

DEATH INVESTIGATION SYSTEMS

- Coroner
 - Elected official
 - Qualifications specified by law
 - May have no medical knowledge
- Medical Examiner
 - Appointed by government
 - Licensed physician, MD or DO
 - May or may not have forensic pathology experience

Death Investigation Systems: 2014



- 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)

PURPOSE OF DEATH INVESTIGATION

- Aid in the administration of justice
- Protect the public
- Assist the family

FORENSIC PATHOLOGY

The subspecialty of pathology that deals with the investigation of deaths which are sudden and unexpected or are the result of violence

DUTIES OF THE DEATH INVESTIGATOR

- Document and interpret injuries and disease
- Prepare a report
- Identification
- Collect evidence
- Estimate the postmortem interval
- Determine and certify cause and manner of death
- Authorize cremation and organ and tissue donation requests
- Testify

DEATHS UNDER THE MEDICAL EXAMINER'S JURISDICTION (ARIZONA)

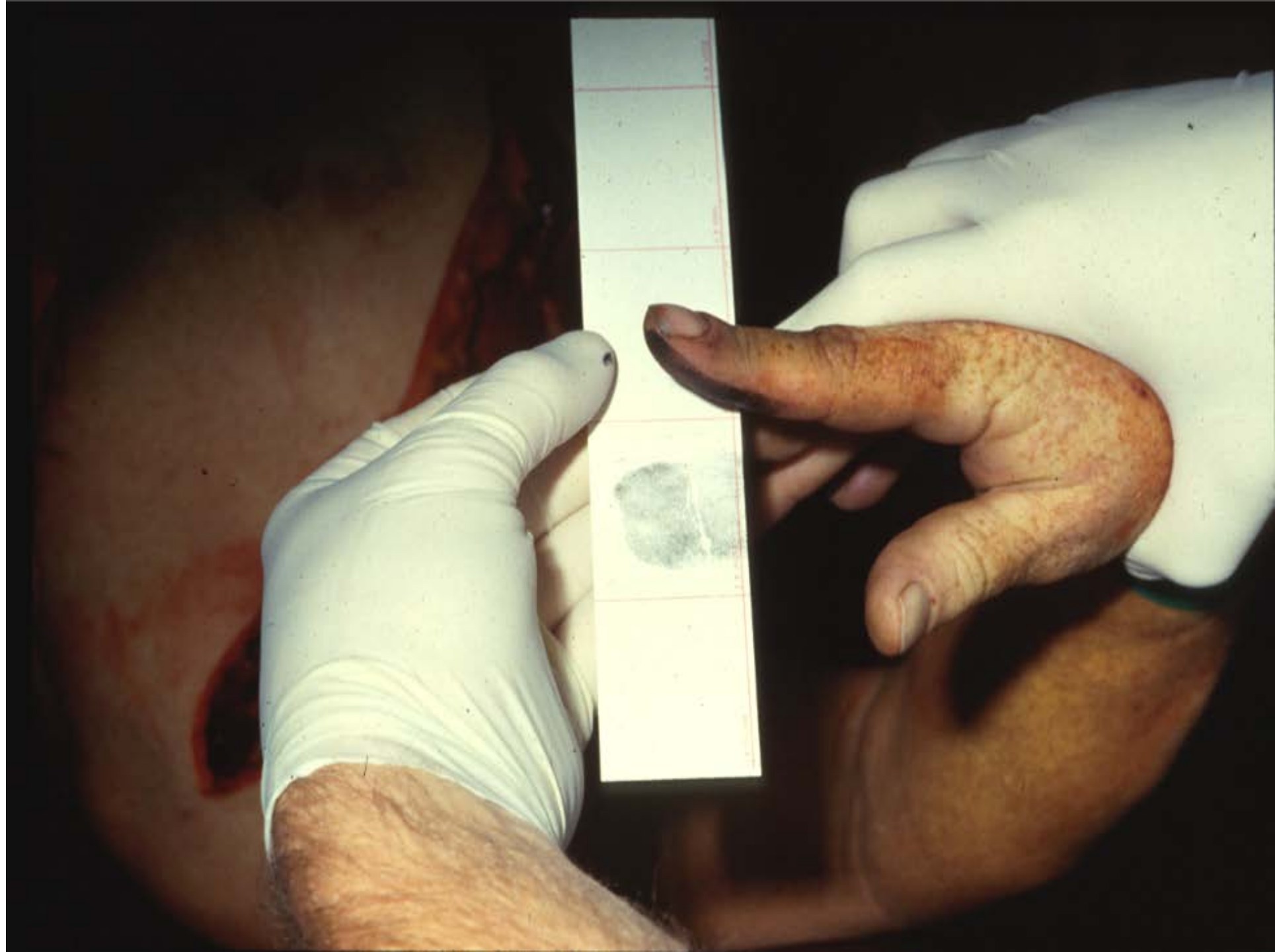
- No doctor available to sign death certificate
- Violence
- Sudden and unexpected
- Threat to public health
- Prisoner or in a prison
- Suspicious, unusual, unnatural
- Related to occupation
- Related to medical procedure
- Unidentified



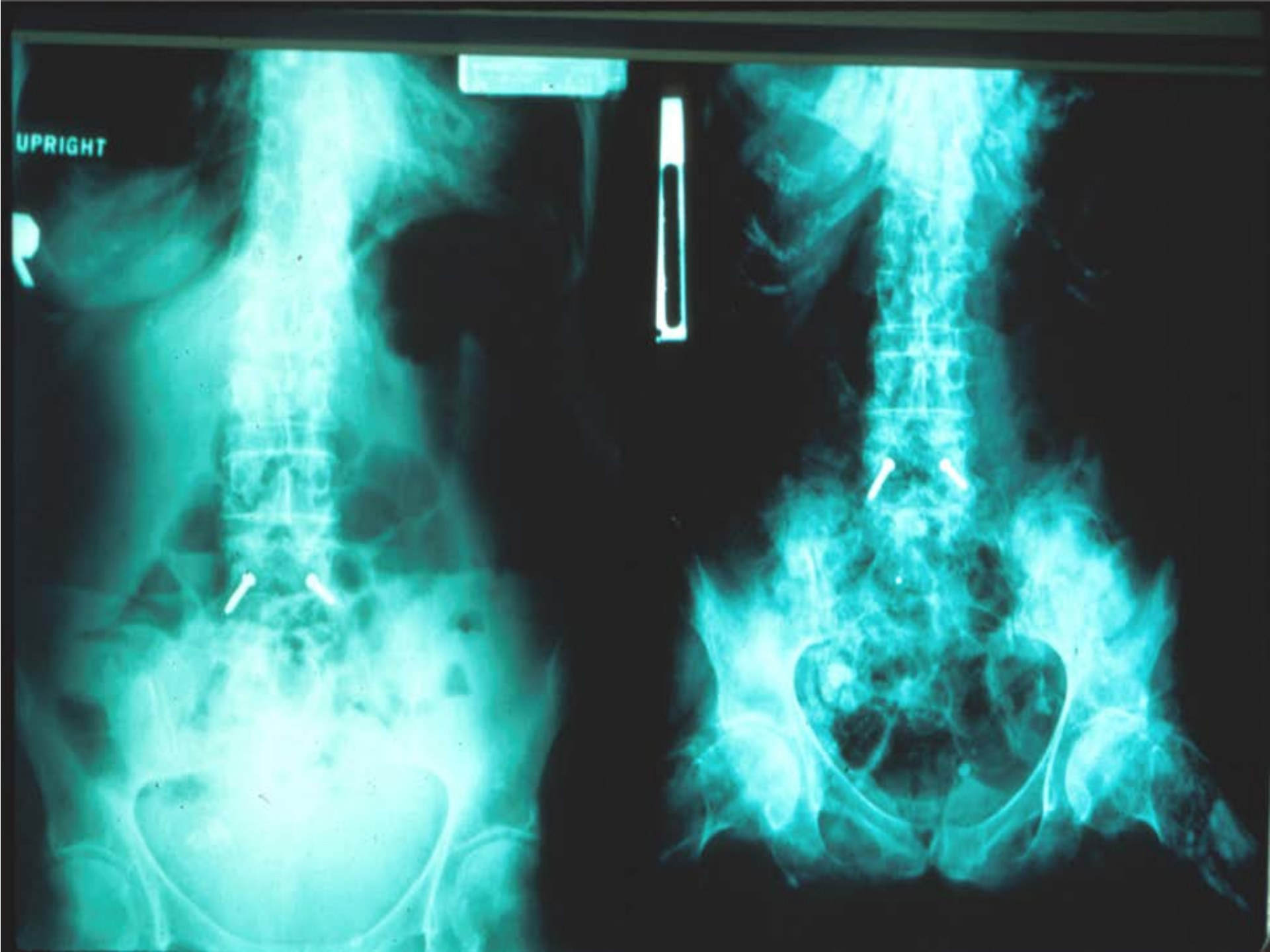
IDENTIFICATION

- Visual
- Fingerprints
- Radiograph comparison
- Dental charting
- DNA
- Circumstantial





UPRIGHT



IDENTIFICATION

- DNA testing
- Bone sample preferred in cases of decomposition
- Sample of bone retained if body released unidentified
- DNA database available
- Expensive



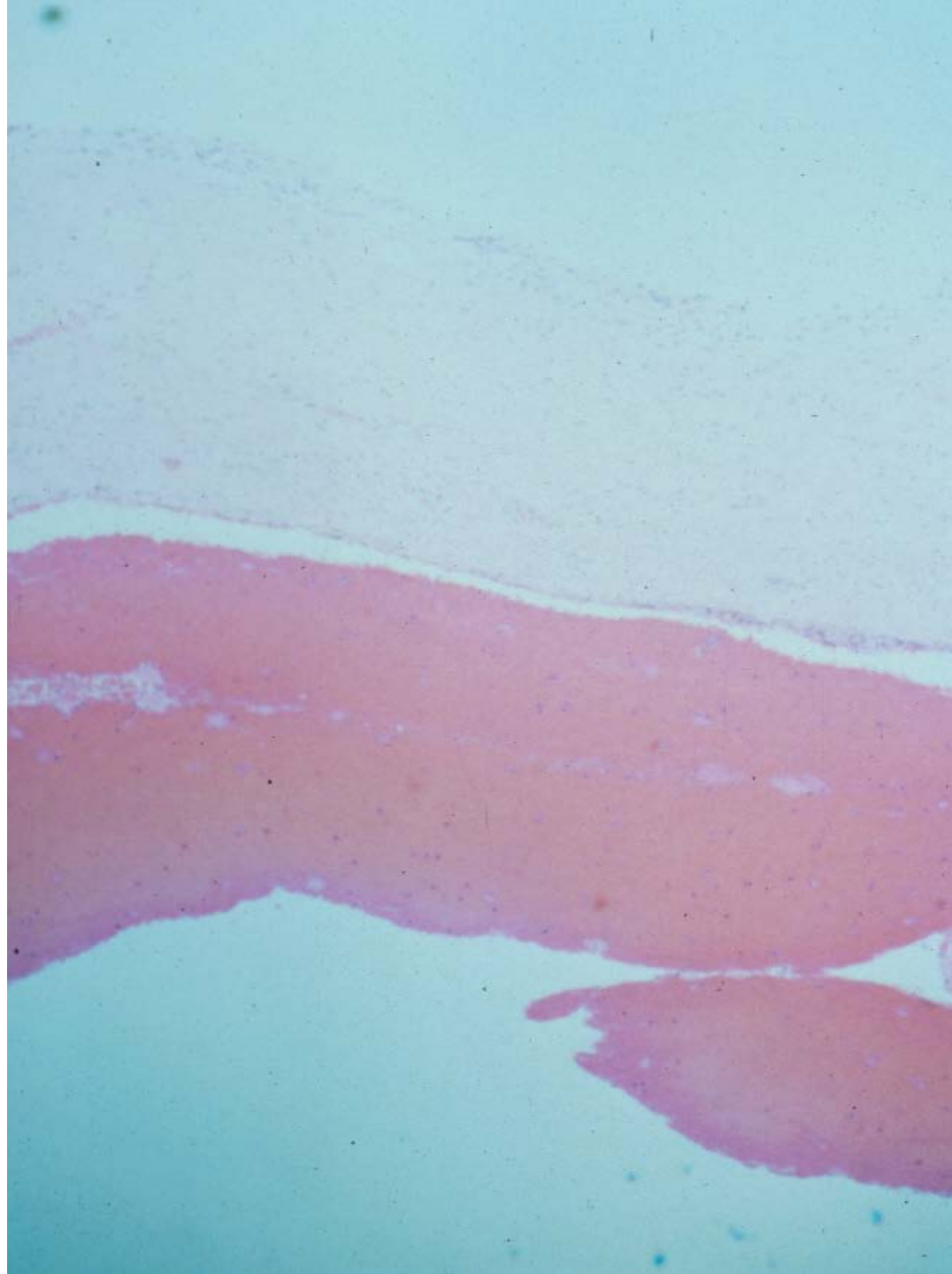
AGING OF INJURIES

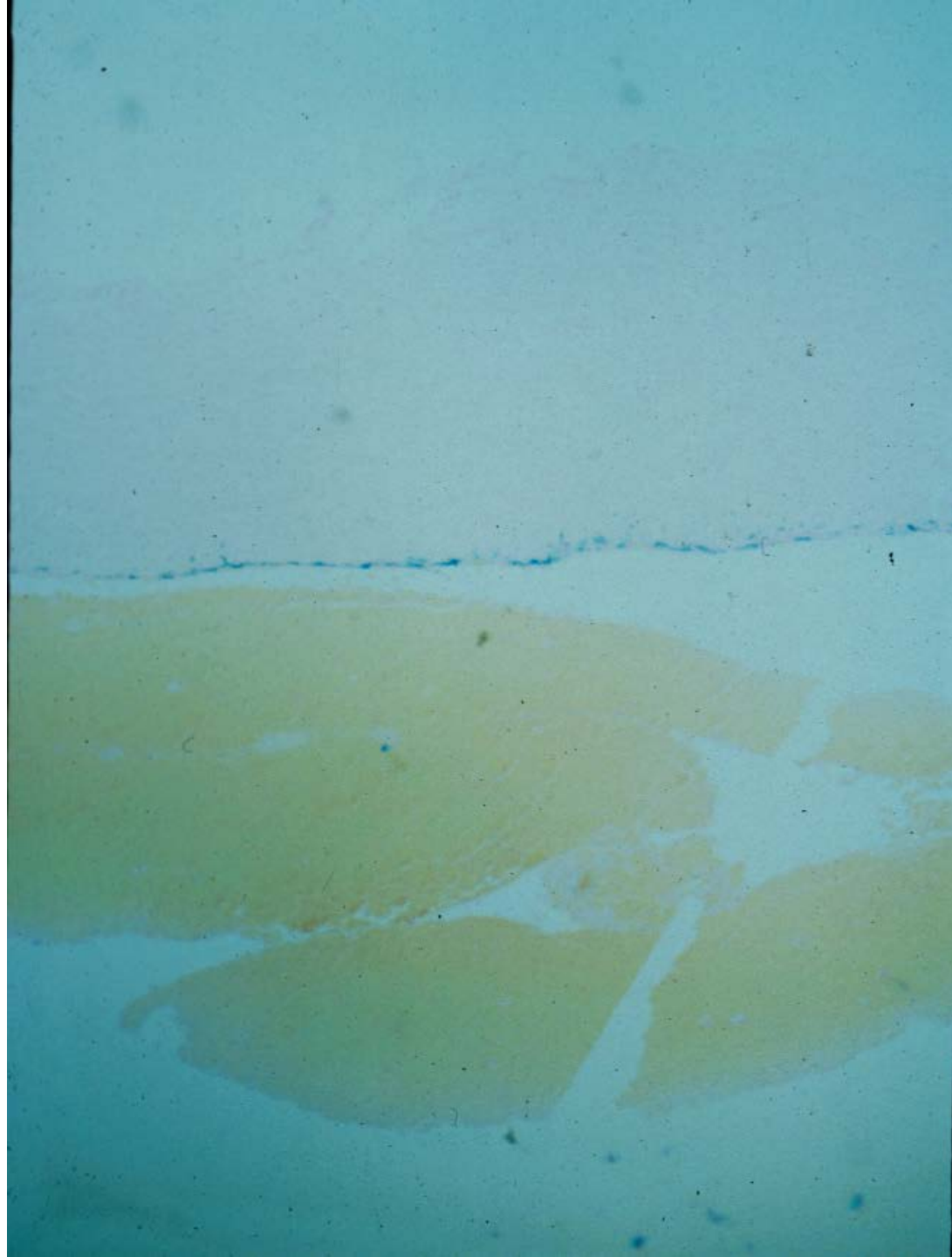
- Important to determine time injury occurred
- Useful for legal purposes

CONTUSION COLOR CHANGES

- Fresh blood appears purple to blue
- The color changes when extracellular hemoglobin in the tissues is broken down into various pigments
- Hemosiderin appears yellow to brown
- Biliverdine and bilirubin appear yellow to green







ESTIMATING TIME OF DEATH

- Rigor mortis
- Livor mortis
- Temperature
- Vitreous electrolytes



RIGOR MORTIS

- Postmortem chemical change in muscle; temperature dependent
- Muscle fibers become cross-linked and fused due to depleted ATP
- Muscle becomes stiff but fibers do not contract
- First noticed within 2 to 4 hours after death
- Maximum rigidity at about 8-12 hours
- Once maximum, remains for additional 12-24 hours

















WOUND INTERPRETATION

- Blunt force trauma
- Sharp force trauma
- Gunshot wounds
- Thermal injuries
- Asphyxia





86 14 03









LABORATORY APPARATUS, FURNITURE
SCIENTIFIC INSTRUMENTS & CHEMICALS

CM 1

2

3

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8

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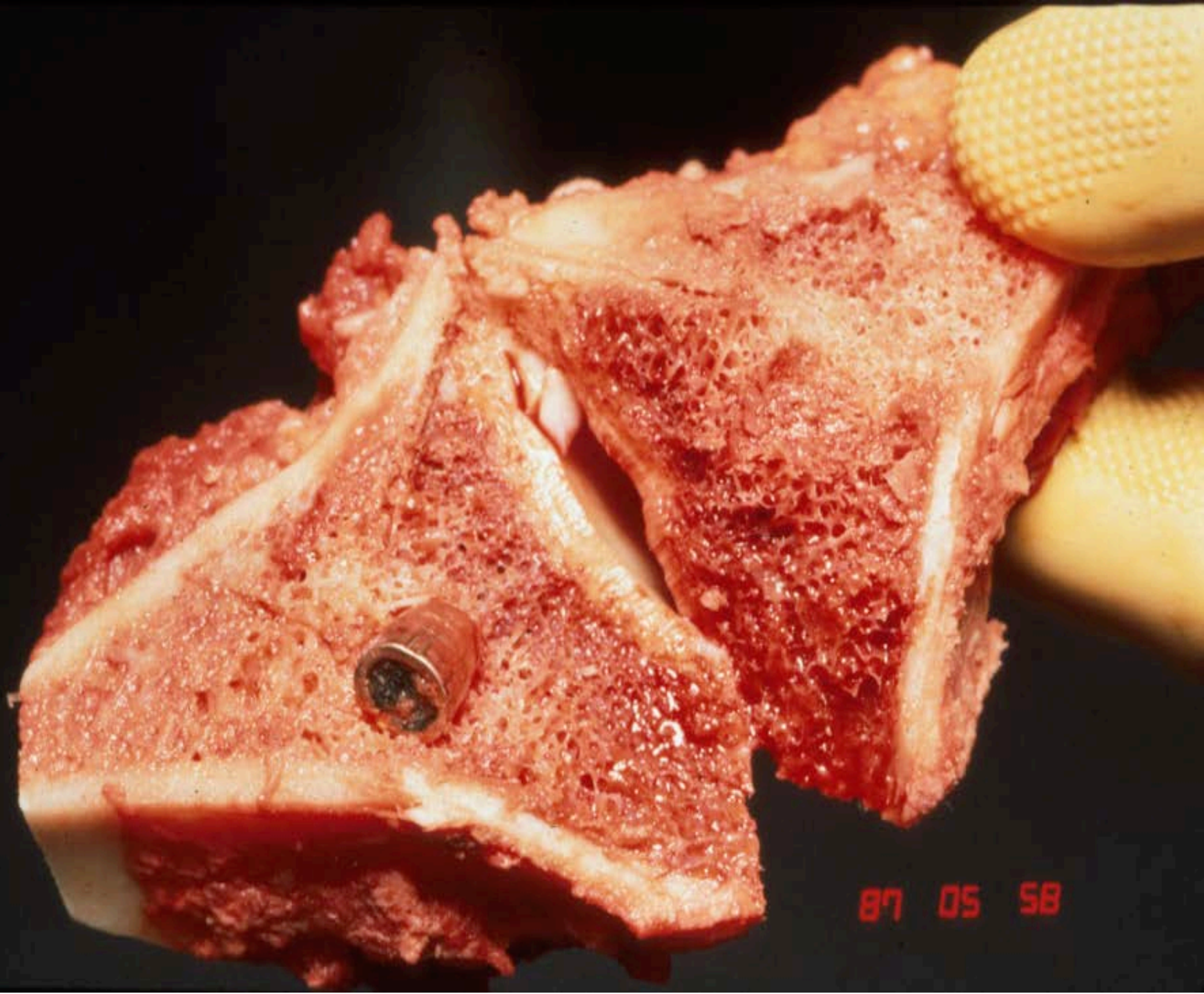


EVIDENCE COLLECTION

- Clothing
- Hair, fibers, paint
- Swabs of mouth, genitalia, skin
- Photography







87 05 58

ESTABLISHING THE (BEST) CAUSE OF DEATH

- May require a review of multiple sources including:
 - Gross autopsy findings
 - Microscopic findings
 - Scene investigation
 - Post mortem toxicology testing
 - Post mortem chemistry
 - Post mortem microbiology
 - Medical records
 - Eyewitness accounts

THE AUTOPSY

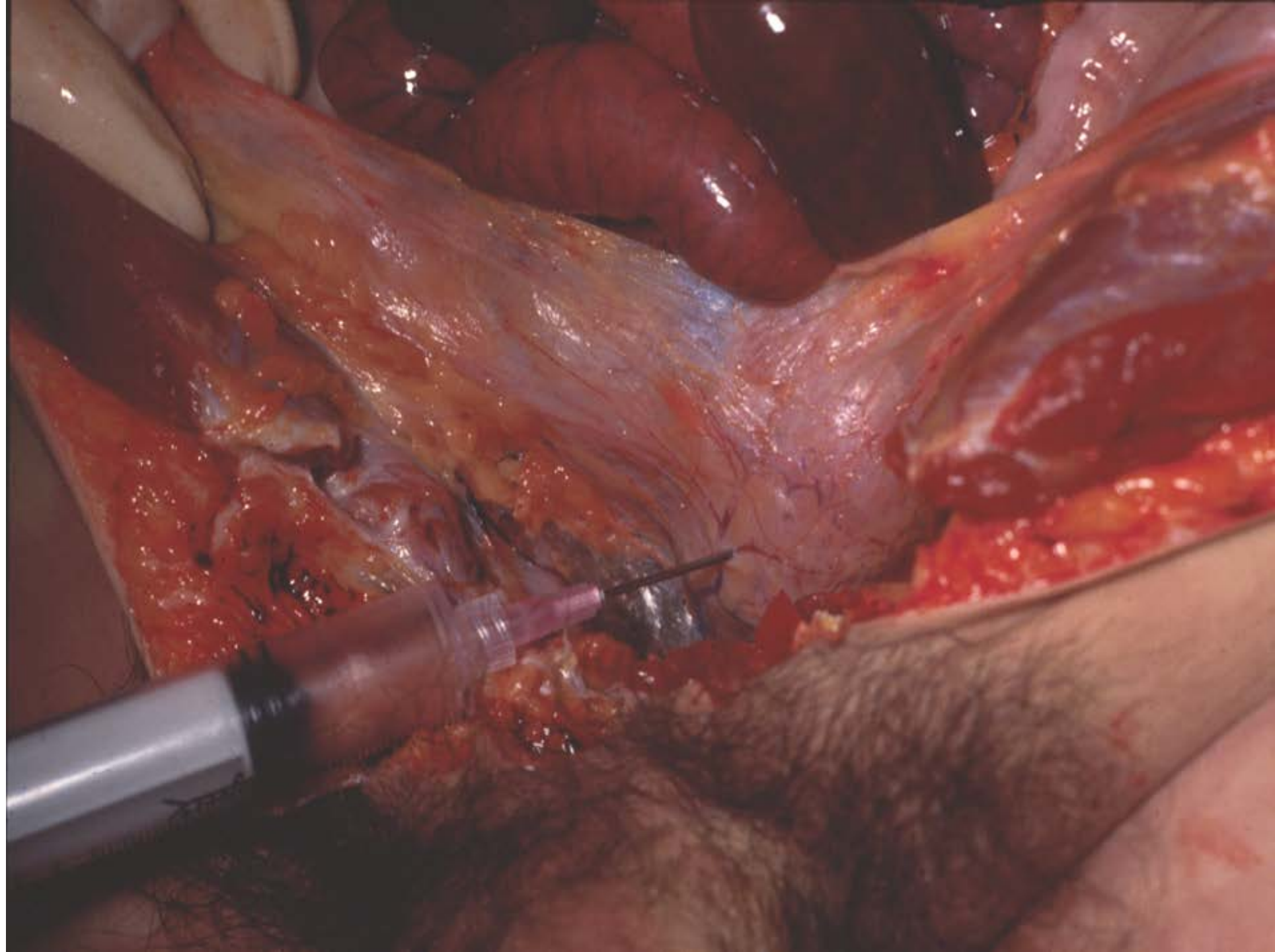
- Important part of the puzzle but not the only part
- Becoming rare in hospitals – 50% in the 50's and 5% today
- Differences between medical examiner/coroner and hospital autopsies











Part I of DC shall contain the disease sequence which directly resulted in the person's death

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE, ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)								
	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				AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify 50.				
48. MANNER OF DEATH		DATE OF INJURY		MO	DAY	YR	HOUR	INJURY AT WORK? (Specify Yes or No)	DESCRIBE HOW INJURY OCCURRED
<input type="checkbox"/> NATURAL CAUSES		<input type="checkbox"/> HOMICIDE		52.		53.	M	54.	55.
<input type="checkbox"/> ACCIDENT		<input type="checkbox"/> PENDING INVESTIGATION		56.		57.		58.	
<input type="checkbox"/> SUICIDE		<input type="checkbox"/> UNDETERMINED		59.		60.		61.	

Cause of Death

The disease or injury responsible for initiating the lethal sequence of events. A competent cause of death should be etiologically specific

Death Certification - Purposes

- Legal document certifying someone has died
- Vital statistics

The death certificate is an
opinion statement

Death Certification Paradox

You don't have to know what precisely what killed the patient to certify the cause of death

Reasonable degree of medical certainty
(more probable than not)

NOT

Beyond a reasonable doubt (100% certainty)

Mechanism of Death

- congestive heart failure
- arrhythmia
- asphyxia
- sepsis
- exsanguination
- renal failure
- hepatic failure
- respiratory failure
- cardiopulmonary arrest
(not a cause of death; it is a description of being dead!!)

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) <div style="text-align: center; font-size: 1.5em; font-family: cursive;">CONGESTIVE HEART FAILURE</div>	
	B. DUE TO OR AS A CONSEQUENCE OF:	
	C. DUE TO OR AS A CONSEQUENCE OF:	
48. PART II. <u>Other significant conditions</u> contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No) 49. NO

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) <div style="text-align: center; font-size: 1.5em; font-weight: bold;">Arteriosclerotic Cardiovascular Disease</div>		
	B. DUE TO OR AS A CONSEQUENCE OF:		
	C. DUE TO OR AS A CONSEQUENCE OF:		
48. PART II. <u>Other significant conditions</u> contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify) 50.

47 SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) Upper GI Bleed	
	B. DUE TO OR AS A CONSEQUENCE OF	
	C. DUE TO OR AS A CONSEQUENCE OF	
48. PART II. <u>Other significant conditions</u> contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No) 49. No

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) Esophageal varices		
	B. DUE TO OR AS A CONSEQUENCE OF: Cirrhosis of liver		
	C. DUE TO OR AS A CONSEQUENCE OF: Chronic alcoholism		
48. PART II. <u>Other significant conditions</u> contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify) 50.

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) Septic Shock			
	B. DUE TO OR AS A CONSEQUENCE OF: Pneumococcal Sepsis			
	C. DUE TO OR AS A CONSEQUENCE OF: Pneumococcal Pneumonia			
PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I 48. Chronic Alcohol Abuse.			AUTOPSY (Specify Yes or No) 49. NO	WAS CA (Specify) 50.

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE) Pneumococcal pneumonia with sepsis			
	B. DUE TO OR AS A CONSEQUENCE OF: Chronic alcoholism			
	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 48.			AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify) 50.

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)	
	ARRHYTHMIA	
	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		AUTOPSY (Specify Yes or No)
48.	SEPSIS	49. Yes

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST. PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)		
	B. DUE TO OR AS A C		
	C. DUE TO OR AS A C		
PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No)	WAS CA (Specify
48.		49.	50.

Need more
information!!!

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)	
	CARDIAC ARREST	
	B. DUE TO OR AS A CONSEQUENCE OF	
RESPIRATORY ARREST		
C. DUE TO OR AS A CONSEQUENCE OF		
HEPATIC FAILURE		
48. PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No)
		49. NO

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)	
	Cirrhosis	
	B. DUE TO OR AS A CONSEQUENCE OF:	
Hepatitis C Infection		
C. DUE TO OR AS A CONSEQUENCE OF:		
48. PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No)
		49.
		50.

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		multiple injuries		
		B. DUE TO OR AS A CONSEQUENCE OF: Patient was run over by a car		
		C. DUE TO OR AS A CONSEQUENCE OF:		
48. PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I			AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify) 50.

47. SEQUENTIALLY LIST CONDITIONS, IF ANY, LEADING TO IMMEDIATE CAUSE. ENTER UNDERLYING CAUSE (DISEASE OR INJURY THAT INITIATED EVENTS RESULTING IN DEATH) LAST.	PART I	A. IMMEDIATE CAUSE (FINAL DISEASE OR CONDITION RESULTING IN DEATH) (ENTER ONLY ONE CAUSE ON EACH LINE)				
		<div style="background-color: yellow; text-align: center; padding: 50px;"> <h1>ME CASE !!!</h1> </div>				
		PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I		AUTOPSY (Specify Yes or No) 49.	WAS CA (Specify) 50.	
48. MANNER OF DEATH		DATE OF INJURY	MO DAY YR	HOUR	INJURY AT WORK? (Specify Yes or No)	DESCRIBE HOW INJURY OCCURRED
<input type="checkbox"/> NATURAL CAUSES <input type="checkbox"/> HOMICIDE		52.	53.	M	54.	55.
<input type="checkbox"/> ACCIDENT <input type="checkbox"/> PENDING INVESTIGATION		PLACE OF INJURY (At home, farm, street, factory, office building, etc.) SPECIFY			WHERE LOCATED?	STREET ADDRESS
<input type="checkbox"/> SUICIDE <input type="checkbox"/> UNDETERMINED		56.			57.	



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and events

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Your opinion is valuable to us.
Please participate in this brief survey:

<https://www.surveymonkey.com/r/SWTRCWebinarSurvey>

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