PROJECT ECHO: OD-FIT

Overdose Fatality Investigation Techniques

Forensic Autopsy and Drug Poisoning Deaths

December 14, 2021

Agenda

- Introductions and Warm-Up
- Didactic Presentation: Forensic Autopsy and Drug Poisoning Deaths, Dr. Kurt Nolte
- BREAK
- Breakout room discussions and networking

Getting to Know the Project ECHO: Overdose Fatality Investigation Techniques

1) To provide a supportive space for coroners, medical examiners, and public health professionals to discuss the investigation and reporting of drug overdose deaths
2) Create opportunities for peer-to-peer engagement about overdose cases and trends
3) To offer opportunities to share and disseminate best practices as they relate to overdose investigation and reporting

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Forensic Autopsy & Drug Poisoning Deaths

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December 14, 2021

Learning Objectives

- Characterize forensic autopsy.
- Justify autopsy performance for potential overdose deaths.
- Identify and discuss alternatives to autopsy in these cases.

Survey

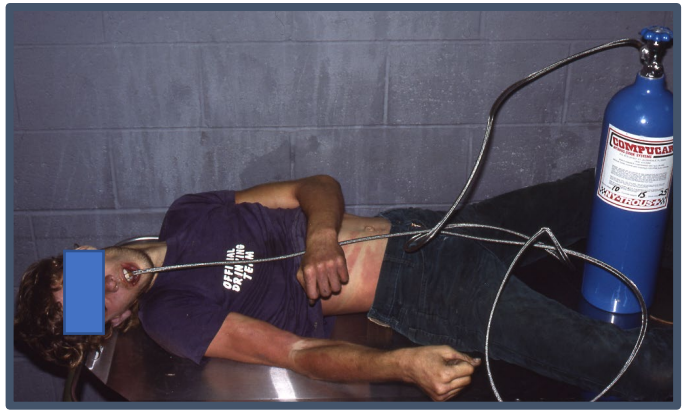
Which of the following procedures do you **ever** use to **definitively** evaluate potential drug overdose deaths? Mark all that apply.

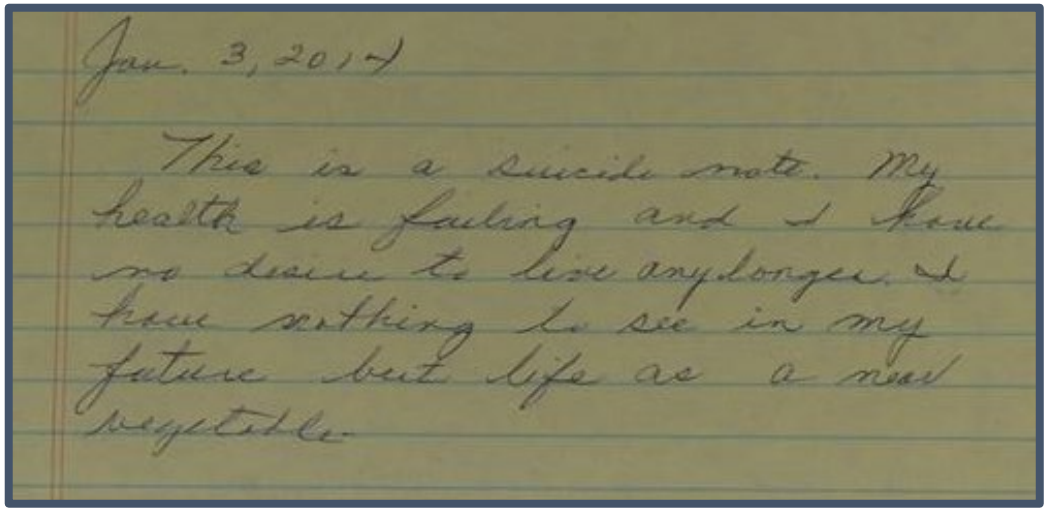
1. External exam and no tox testing
2. External exam + liquid matrix (e.g., urine) point-of-care (POC) tox screening
3. External exam + lab-based tox testing
4. External exam + Computed tomography (CT) + POC tox screen + lab-based tox testing
5. Autopsy + lab-based tox testing
6. I don't make decisions about postmortem procedures for drug overdose deaths.

Forensic:
forum (public, in open court) Latin

Autopsy:
autos (self) + optos (seen) Greek

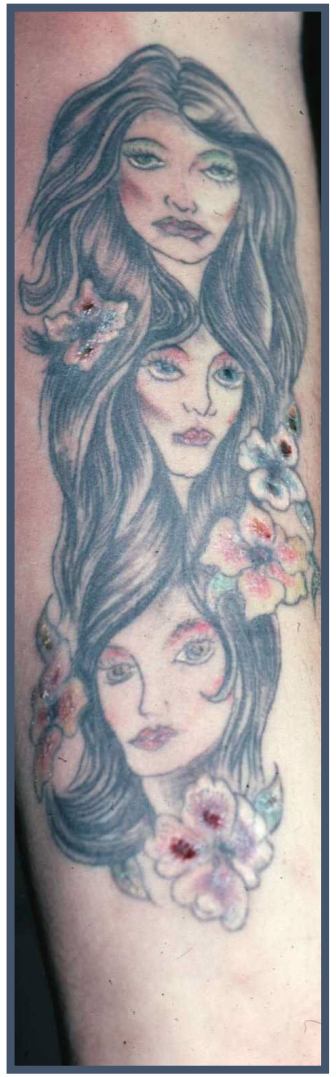
Forensic Autopsy: Circumstances and Scene

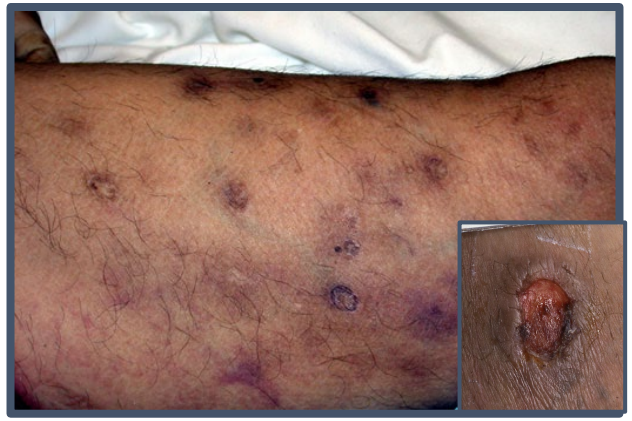




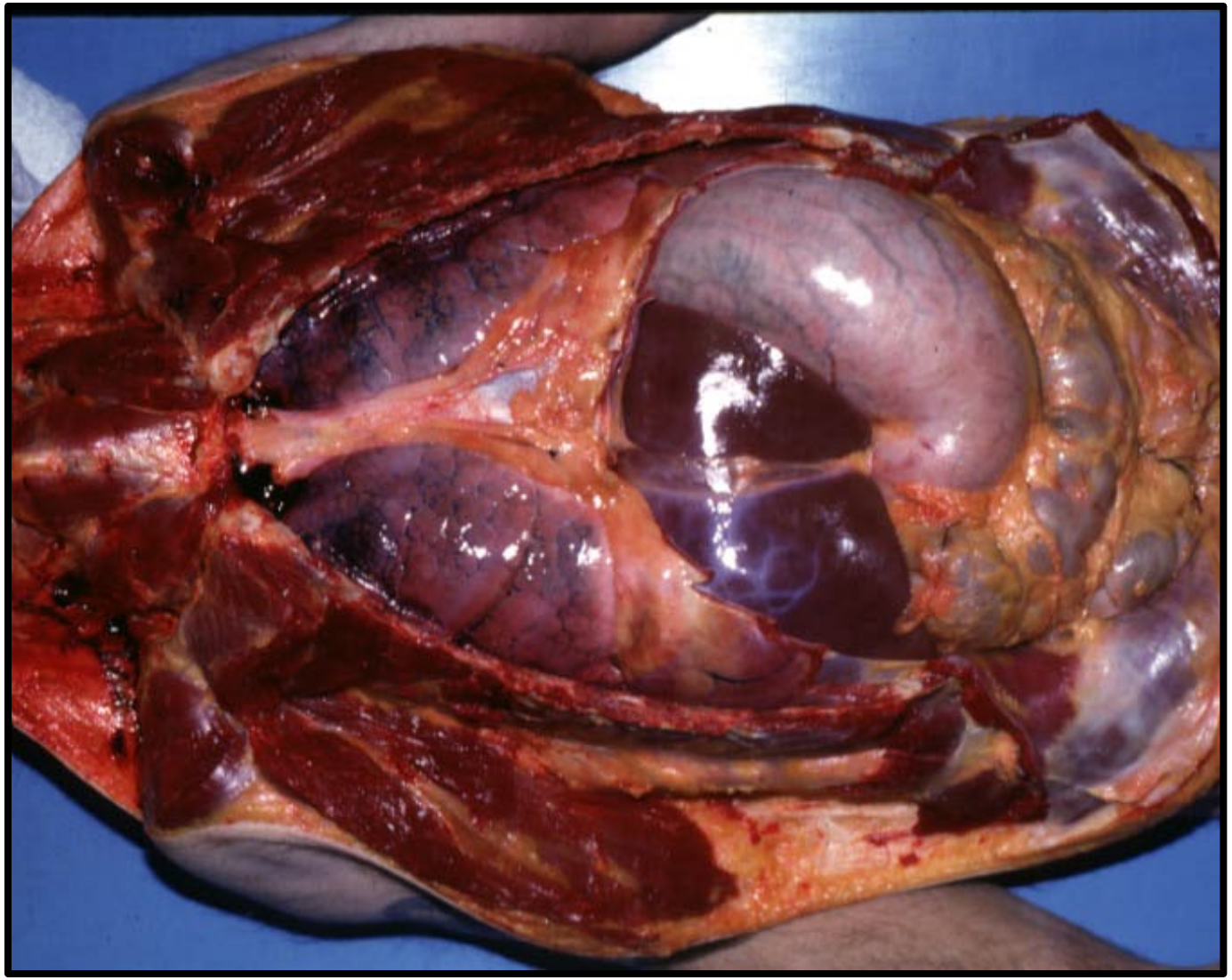
Forensic Autopsy: External Exam

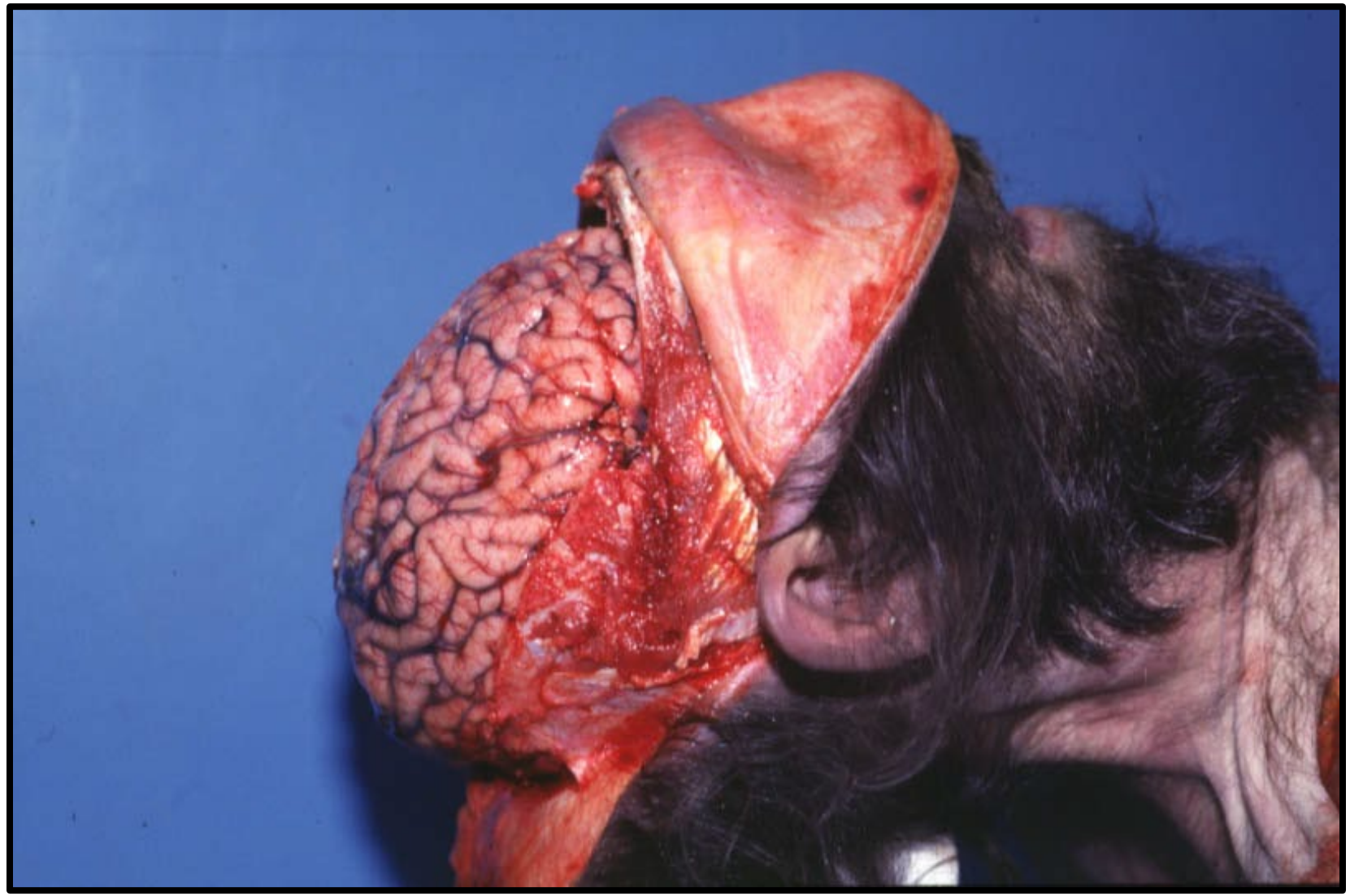
Stigmata of Injection Drug Use





Forensic Autopsy: Visceral Exam



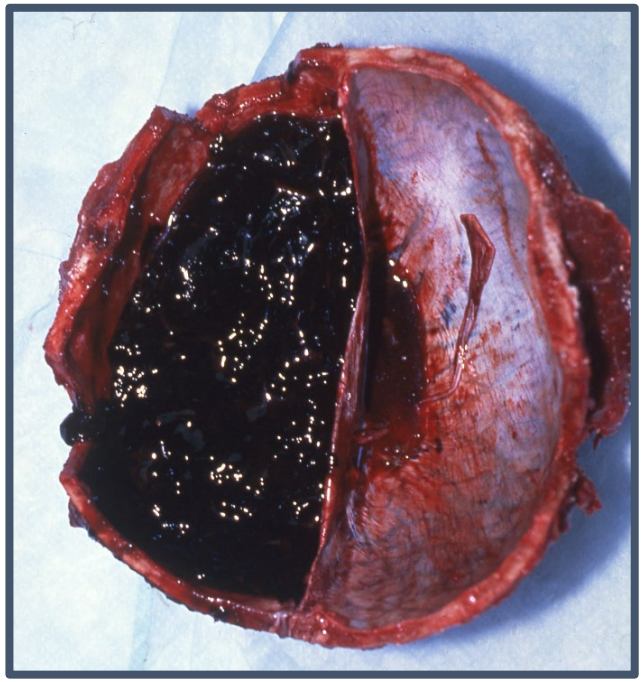


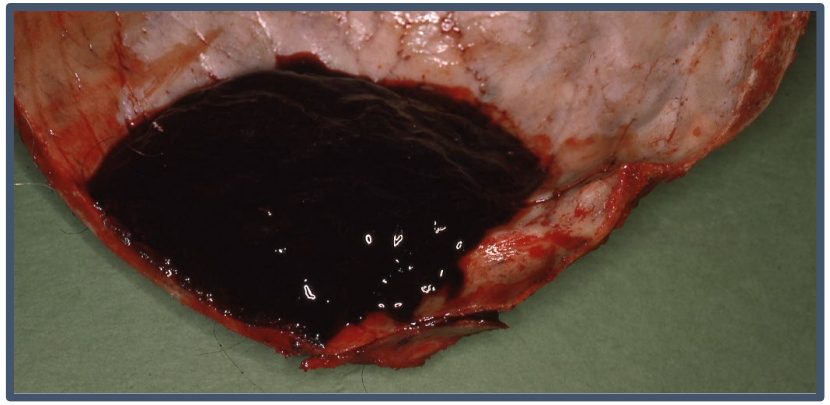
Forensic Autopsy

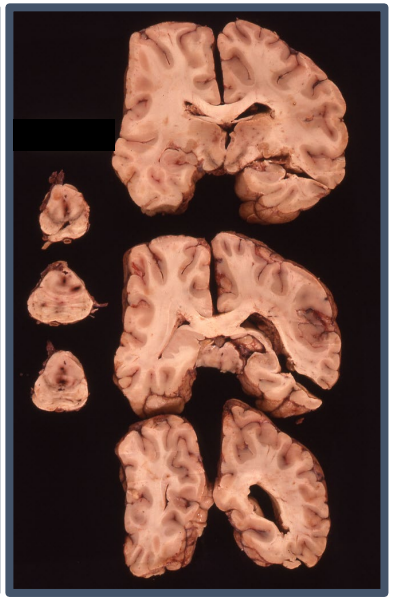
- Histologic exam
- Lab tests: toxicology, cultures, etc.
- Synthesize
  - Pathologic diagnoses
  - Determine cause and manner of death

Why do a visceral examination?

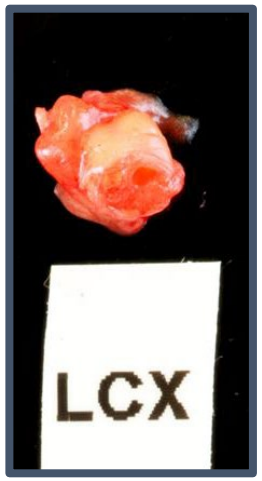
Exclude Trauma

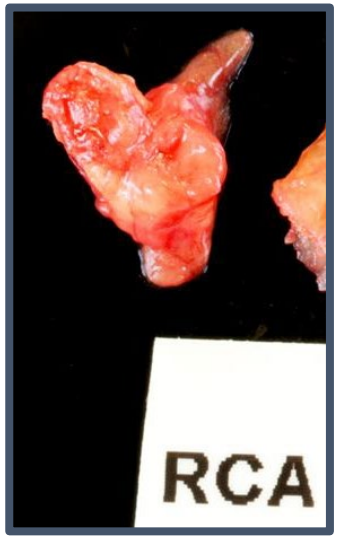






Identify Comorbidities





Identify Fatal Secondary Consequences

IVDA & Infections

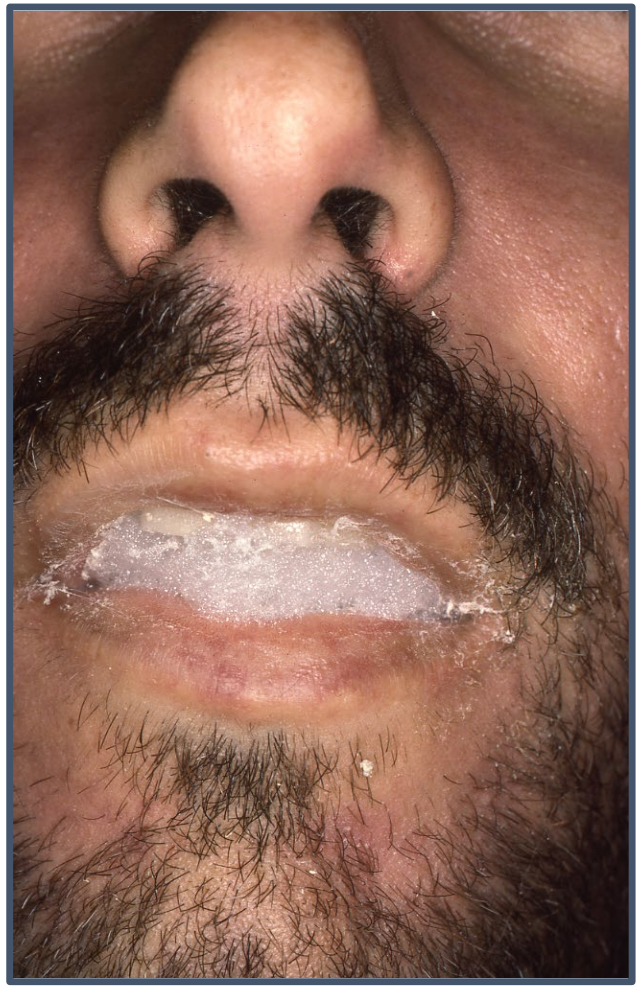
- HIV, HCV, HBV
- Endocarditis
- Soft tissue infection
- Brain abscess
- Osteomyelitis
- Pneumonia

Discover Findings that Assist with MOD

Obtain Adequate Specimens for Toxicologic Analysis

Non-specific Findings

- Pulmonary edema
- Cerebral edema
- Bladder distension



Potential alternatives to autopsy?

Resource constraints

- Rising caseloads
- National shortage of forensic pathologists

Survey Results

Use of Circumstances Alone- No exam or lab

261 presumed natural deaths that received autopsies*

- Circumstances reviewed by 2 pathologists- COD consensus
- Correct COD in 72% of cases
  - 4 (1.5%) cases of fatal drug overdoses
- Challenges similar to those faced by attending clinicians
- Impact National health statistics

Process & consequent error rate acceptable in most ME/C offices

*Nashelsky MB, Lawrence CH. Am J Forensic Med Pathol 2003, 24:313-19

External Exam + Lab-based Tox Evaluation

- 60 cases (22 natural, 38 accidental drug OD)* that received autopsies
- Circumstances + External exam + Tox
- 3 pathologists➡COD➡ compared to original COD
  - Overall, 73% agreement between reviewer and autopsy-based COD
  - 80-83% agreement for cases with history or scene supporting drug use
  - Limitation: only cases with Part I, line a COD statements
  - Is this level of accuracy acceptable?

*Dye DW, et al. Am J Forensic Med Pathol. 2019, 40:99-101

Utility of Postmortem CT in Supplanting or Supplementing Medicolegal Autopsies

- Evaluate 4 subsets
  - Blunt force injuries (200 cases)
  - Firearm injuries (200 cases)
  - Drug poisoning deaths (460 cases)
  - Pediatric trauma (76 cases)

PI- Nolte

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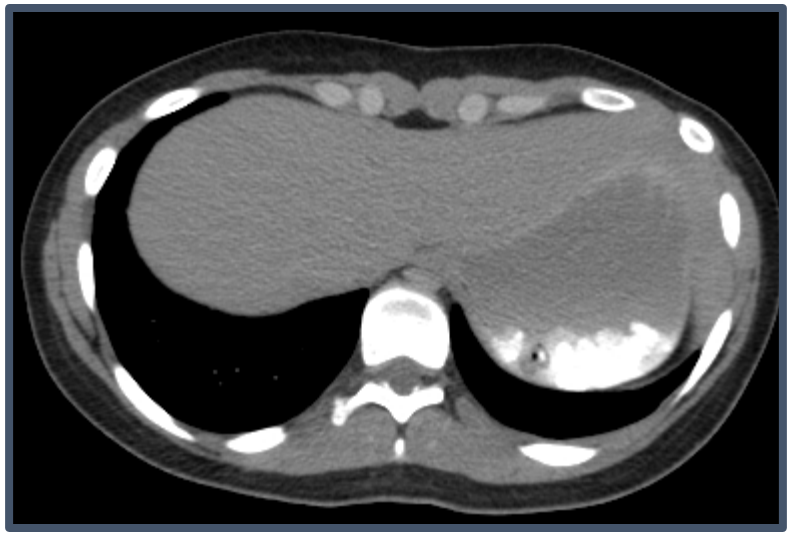
Study Methods

- Prospective- CT all autopsy cases prior to autopsy
- Double blind, radiologists have access to history
- Autopsies- board-certified pathologists
- CT scans- board certified radiologists
- CT & autopsy- Injuries AIS coded
- Drug poisoning cohort- 2nd pathologist uses CT as substitute for autopsy in determining COD
- Consensus conference
  - Different pathologist & radiologist
  - Congruence comparison- autopsy & CT injury findings, cause of death statements

Correct Cause of Death- Drug Poisoning

Age	# of cases	CT	Autopsy
<50 years	223	84%	100%
50 years+	234	73%	99%



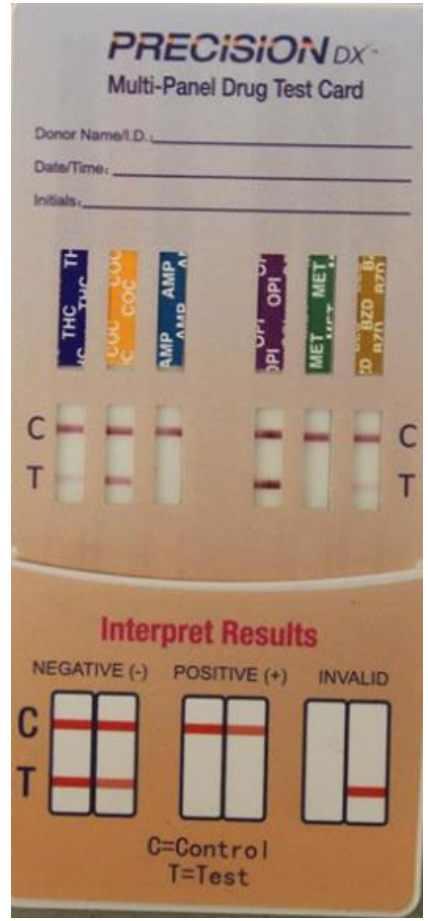
POC Urine Drug Screen*

Opportunities

- Case triage
- Fast-track death certificates
- Stakeholder information
- Real-time surveillance

Limitations

- Products don't match ME/C needs- urine vs bld
- Sensitivity & specificity
- Inadequate w/o confirmatory lab testing



*Shute R, et. al. (2021). Use of rapid toxicology screening tools in medical examiner/coroner offices. National Institute of Justice.

CT + POC Urine Drug Screen – Triage Scenario*, NM

- Decedent under 40
- No history/symptoms of natural disease
- Scene consistent with drug abuse and/or a prior history of drug abuse;
- CT shows no trauma or lethal natural disease.

If all the above criteria are met, a POC drug screen may be performed.

- NEGATIVE: Full autopsy should be performed.
- POSITIVE: External examination may be performed with mandatory confirmatory tox testing.

*New Mexico Office of the Medical Investigator. Case Triage- Standard Operating Guidelines, Version 4.0 August 2020