

Case Study #2

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Iowa Office of the State Medical Examiner

“I have no financial relationships to disclose for this presentation”

The ME's role as a Public Servant

“The proportion of medical examiner cases having some relation to public health is 100%.”

- Charles Hirsch, MD
Chief Medical Examiner, City of New York



Lessons Learned

1) Cause of Death and Manner of Death

2) "The WHY"



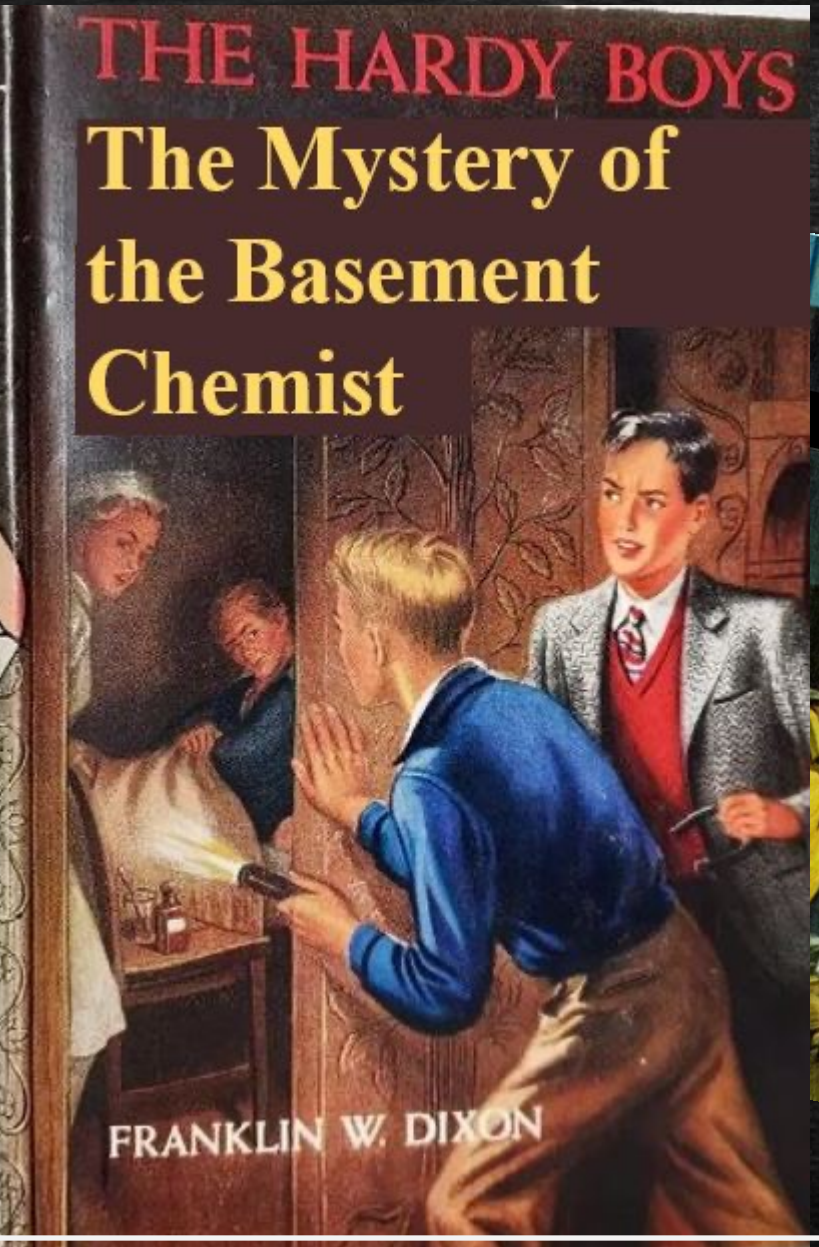


Table Of Contents

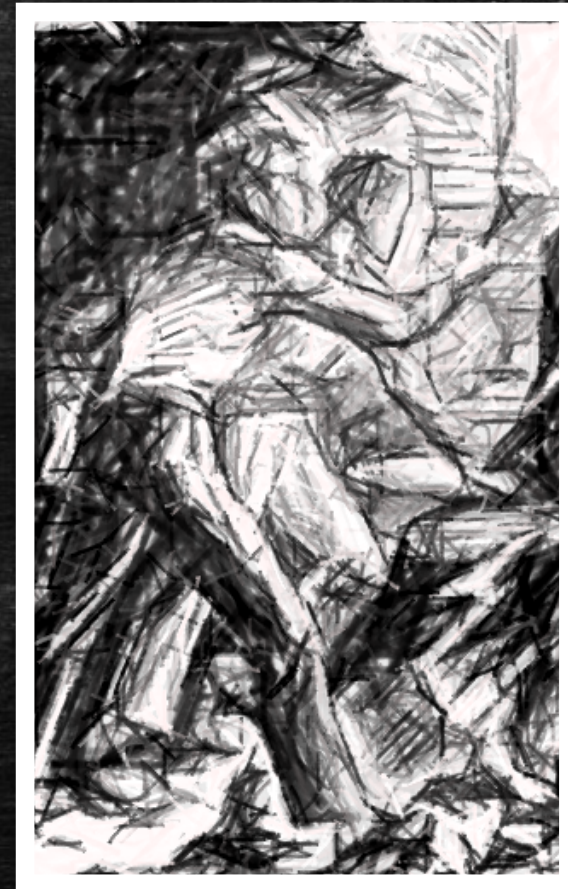
I - Building the Why

II - Scene Investigation

III - Autopsy

IV - Investigation Continued

V - The Final Chapter

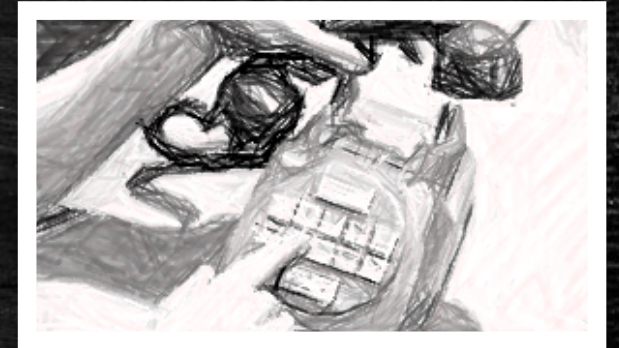


Chapter 2:
Scene
Investigation



Call from Dispatch

- There has been a death at 4821 Dominick Dr.
- Male, 23 years old
- Found down in his bedroom by Mom
- Possible drug paraphernalia on scene

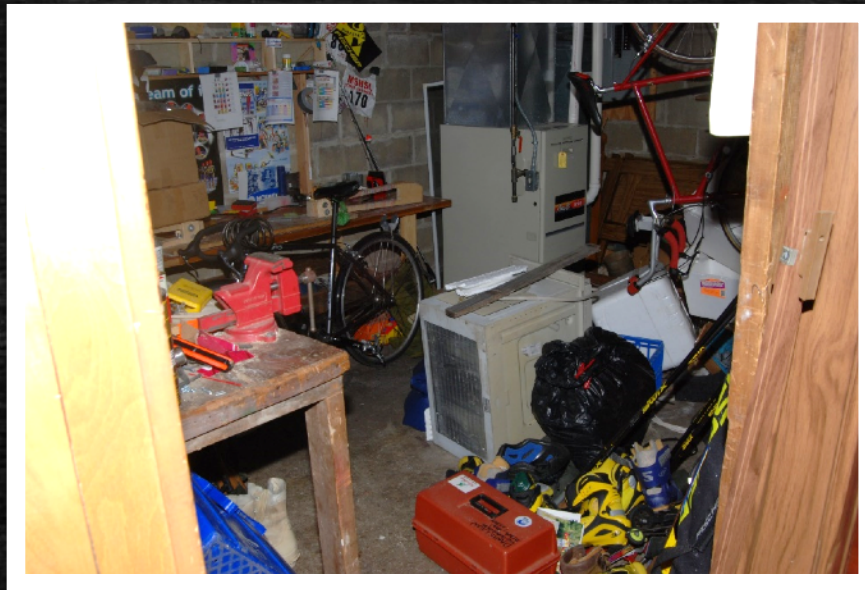


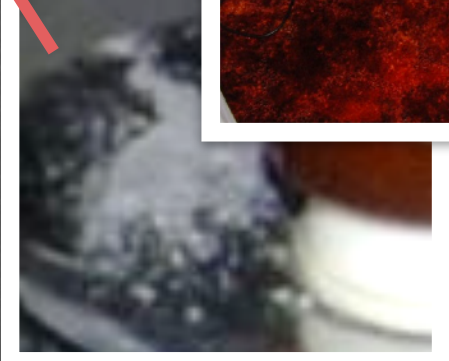
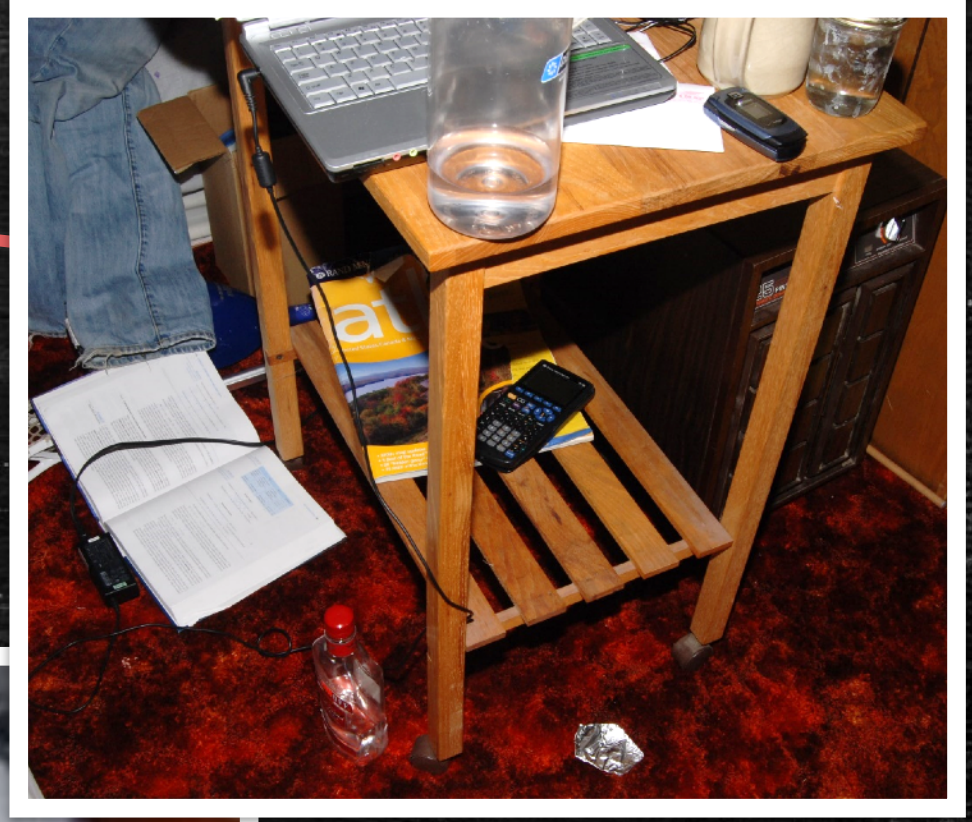
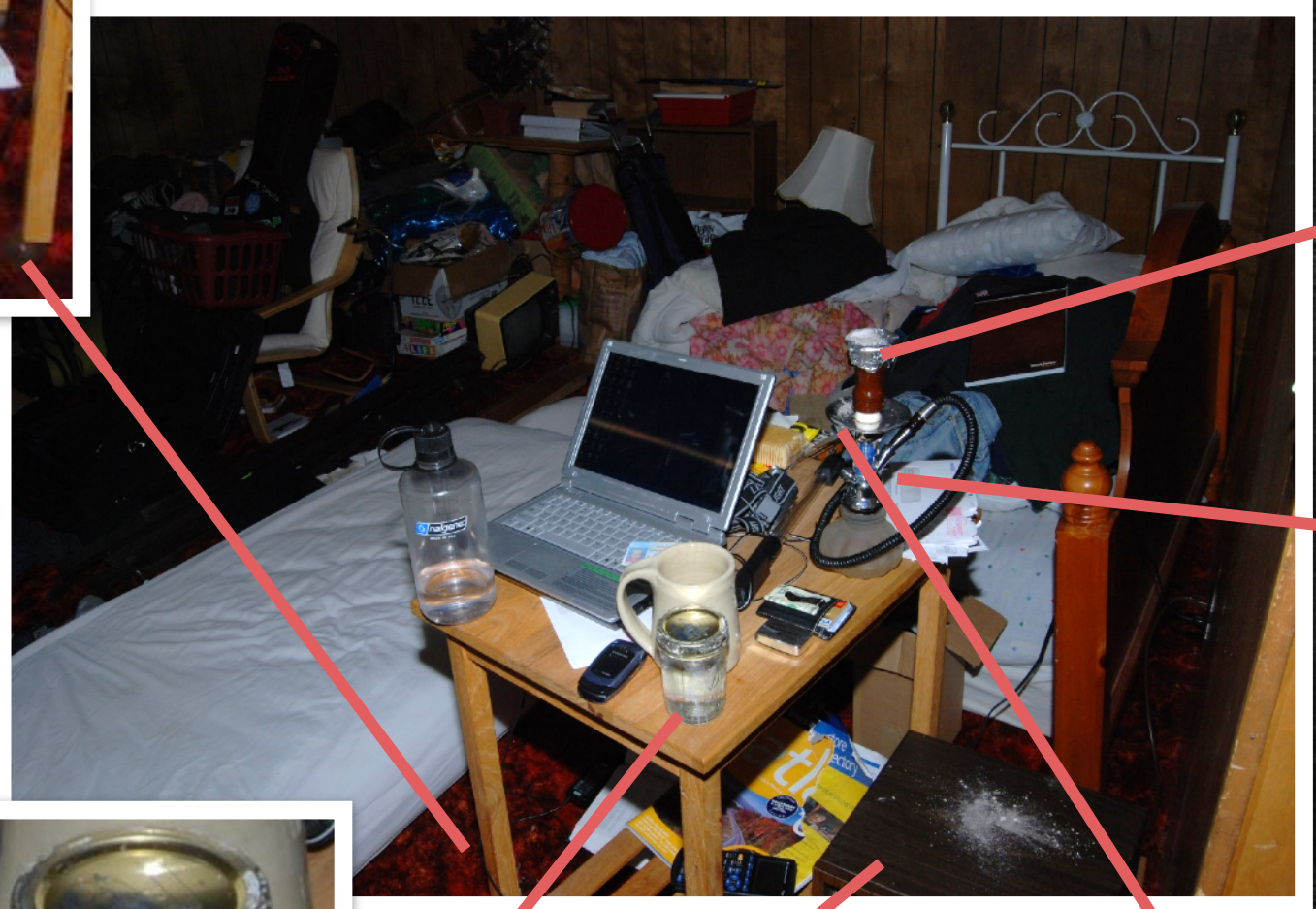
Arrival On Scene

Law Enforcement

- Confirmed 23 year old male
- Found by his mother in his room (4/30/2024 @ 8:55am)
- Last seen 4/29/2024 at 10:15pm
- Nobody else in the house and he did not leave
- Not married and no children
- No medical history known
- Only legal history is a recent DUI





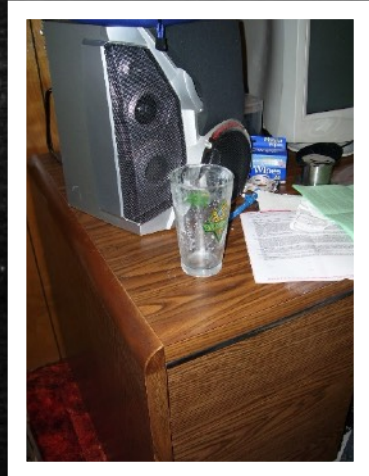
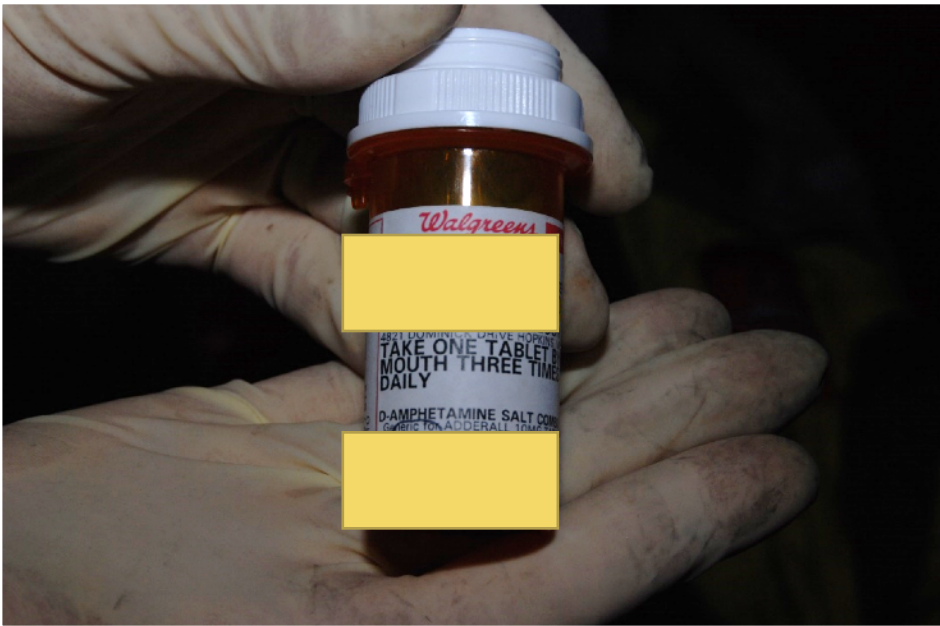
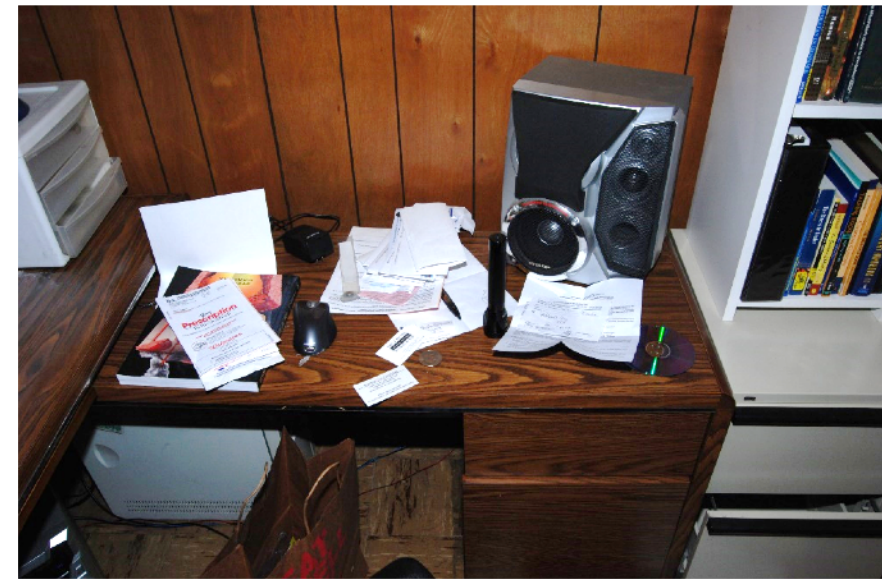












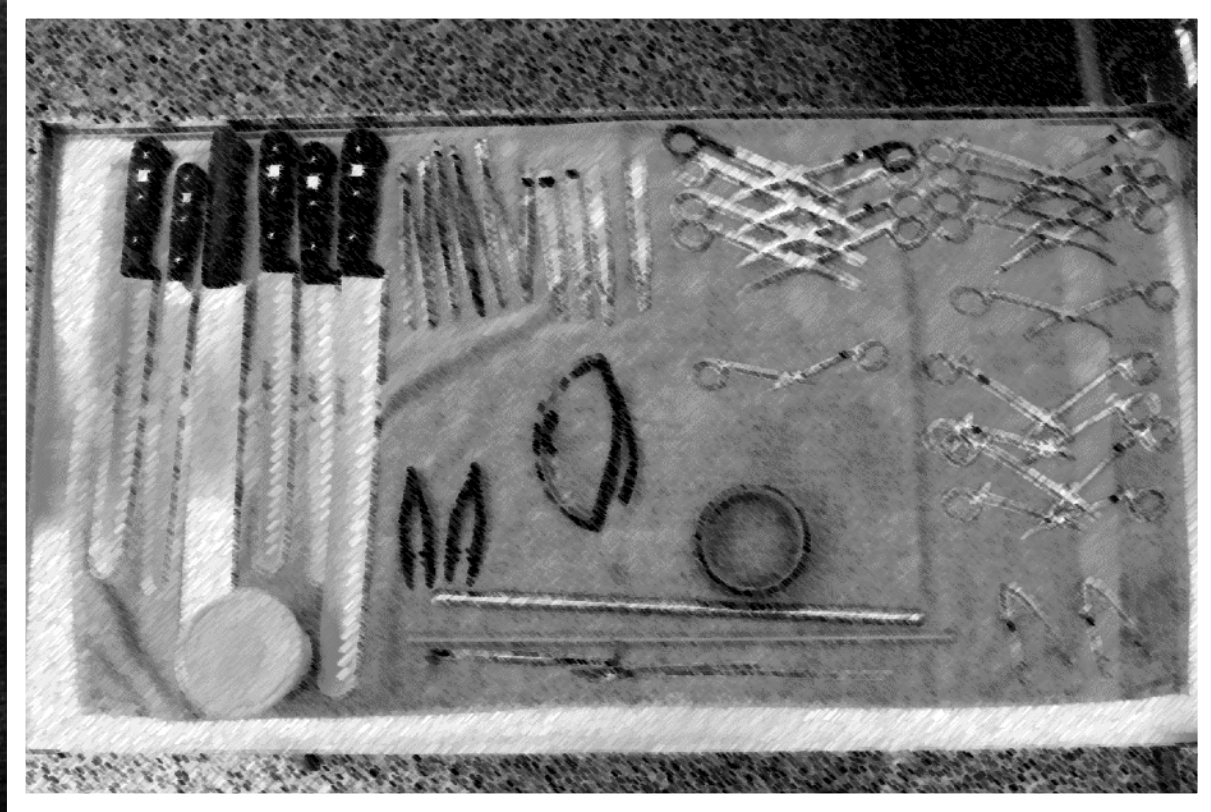
Interview With Mom (General)

- No Spouse or children (Parents Direct NOK)
- Mechanical Engineering student
- Last seen 4/29/2024 at 10:15pm
- Mom found him 4/30/2024 at 8:55am
- Recently lost job
- Girlfriend broke up with him due to alcohol abuse
- Recent DUI
- Required to stay at mom's house due to financial struggle

Interview With Mom (Medical/Substance)

- ADHD
 - Adderall
- Past concern for a heart murmur (No issues for multiple years)
- Family history of cardiac issues and cancer
- Depression
 - Previous apparent suicide attempt, slit wrists (no date given)
- Chronic ethanol abuse
- Vapes everyday
- No cigarette use
- Past Marijuana use

Chapter 3:
Autopsy



Differential Diagnosis

- Natural diseases

- Cardiomyopathy
- Channelopathy
- Myocarditis
- Pulmonary embolus
- Non-traumatic intracranial hemorrhage

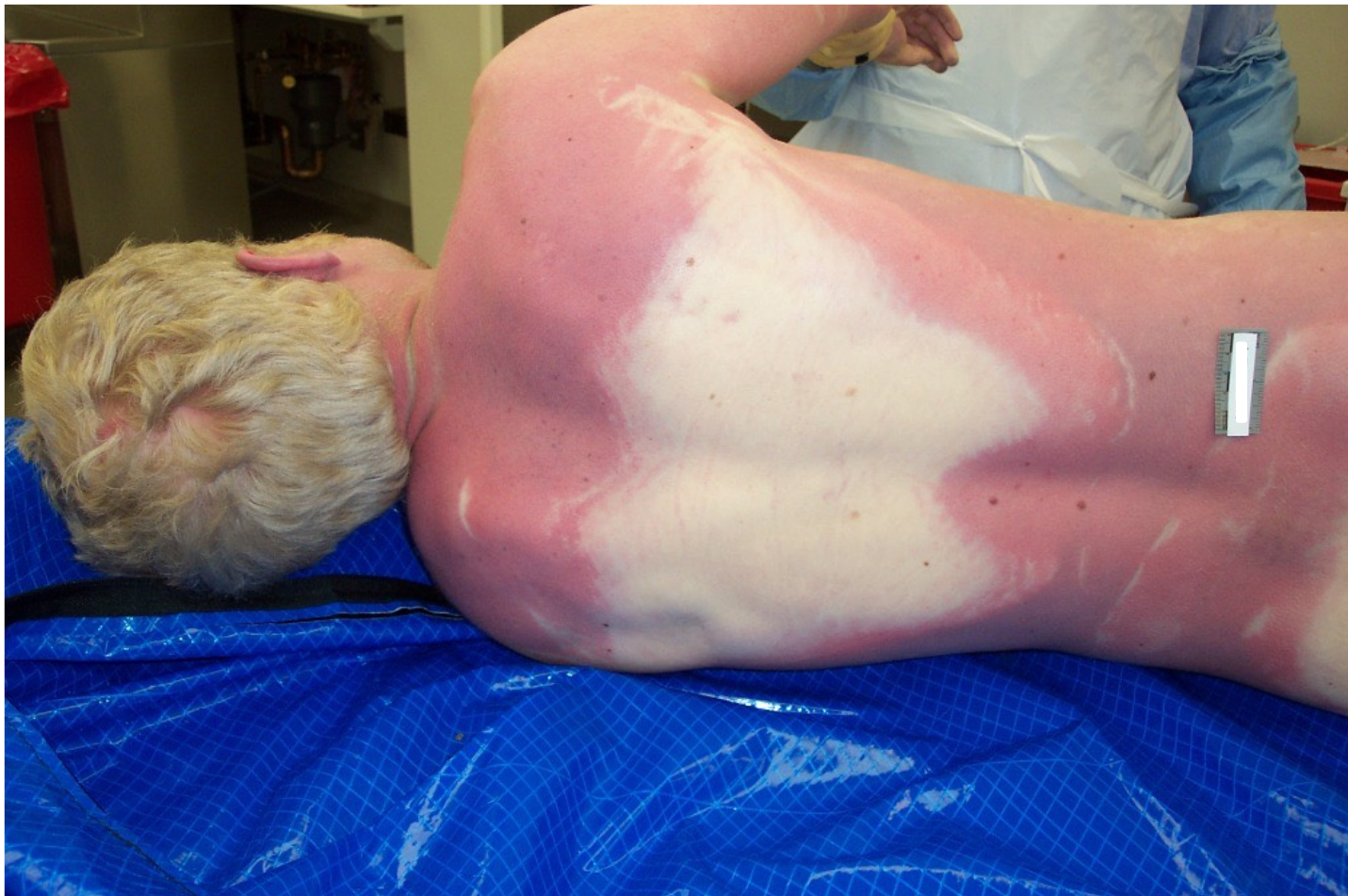
- Traumatic injuries

- Asphyxia
- Recent fall/assault
- Electrocution

- Chemical injuries

- Drug OD
- Heavy metal poisoning

Autopsy Findings



Toxicology

- Ethanol: 0.02 g/dL.
- Drugs
 - Amphetamine: 0.2 mg/L (therapeutic 0.01 – 2 mg/L)
 - Doxylamine: 675 ng/mL (therapeutic 50 – 500 ng/mL)
- Drug Screen on clear liquid: No alcohols or drugs detected

Additional Testing

- Additional slides of heart submitted
 - No evidence of inflammatory processes

- Arrhythmia and Cardiomyopathy Panel ordered
 - Within normal limits

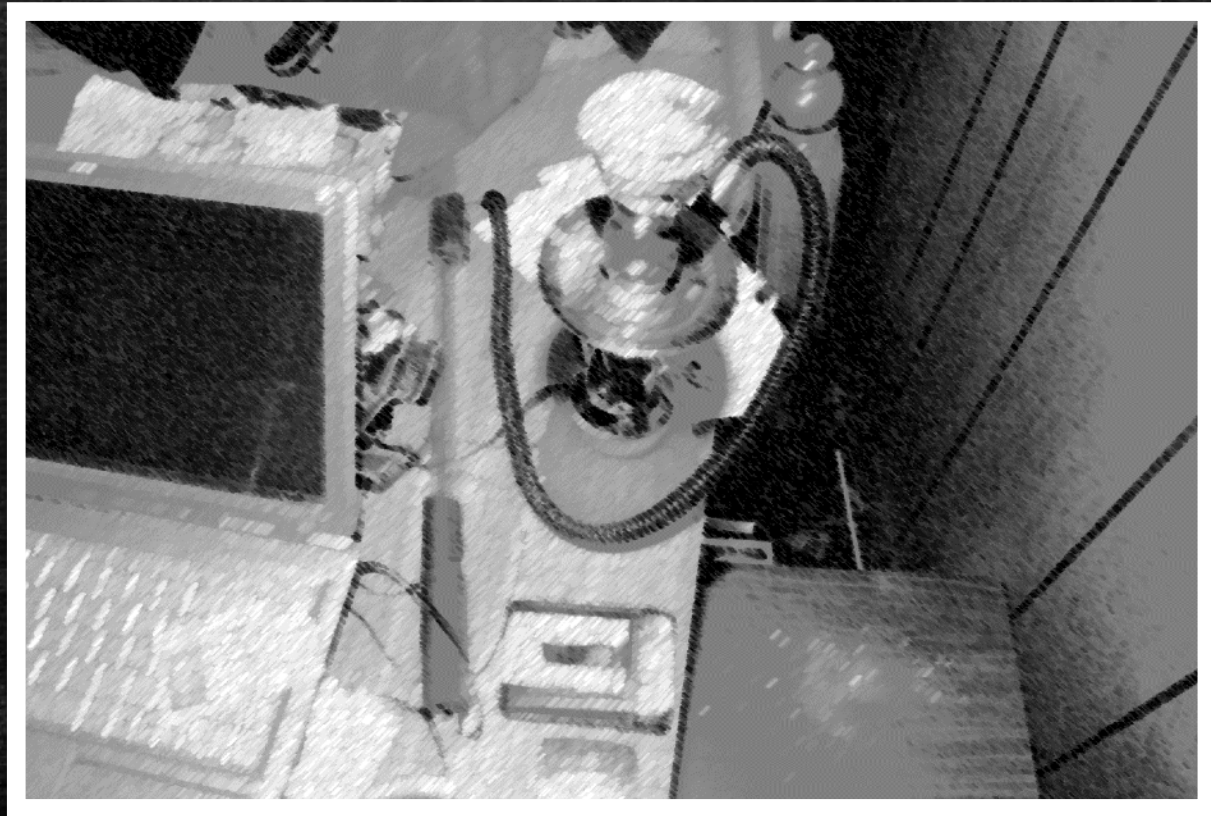
Death Investigators Greatest Tool?

Slide courtesy of Dr Kathryn Berg, M.D.



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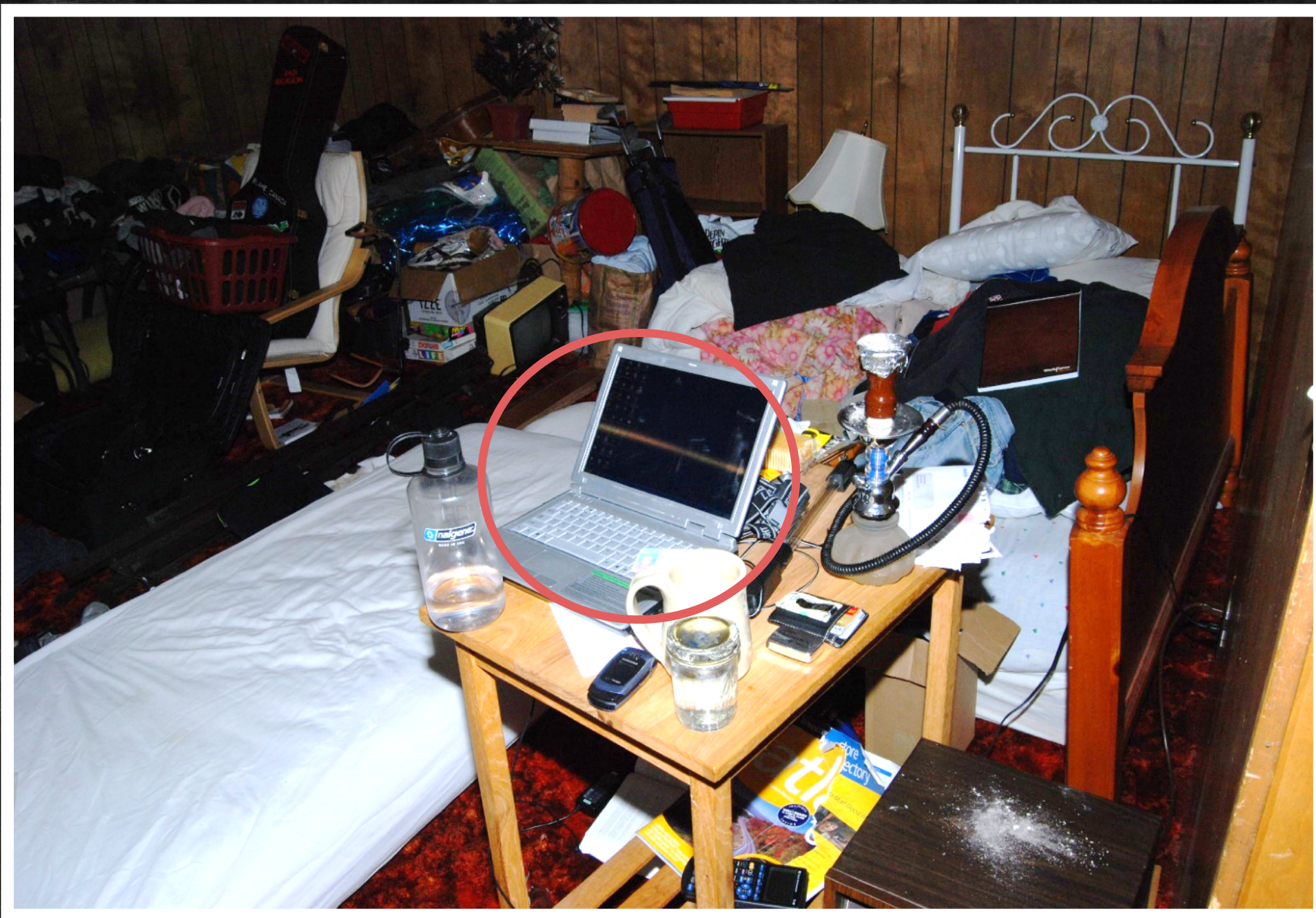
Chapter 4:
Investigation
Continued



Follow up With Mom

- Recently seen surfing the web for cyanuric acid
- Ingestion of cyanuric acid interferes with the SCRAM B





Other Items that Store Digital Evidence

- Phones
- MP3 Players
- ~~s~~
- ~~v~~
- Video Games (Playstation, X Box)
- External server
- Bank Account Transactions

Partner With Police



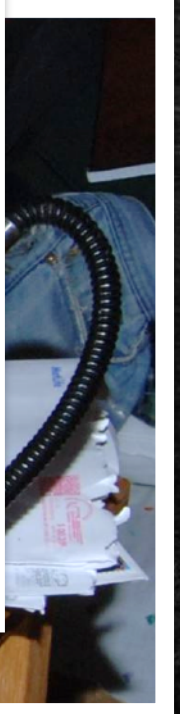
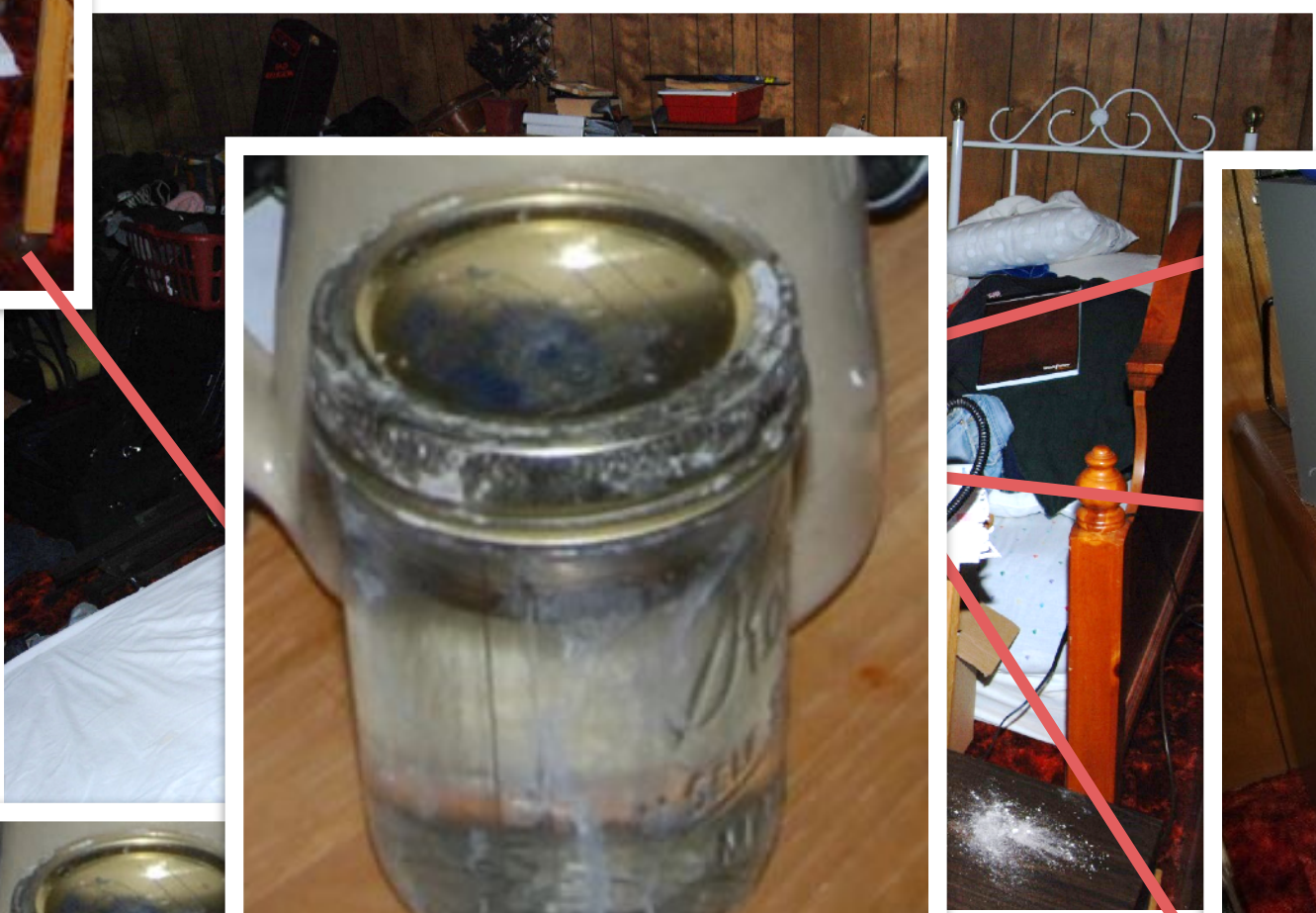
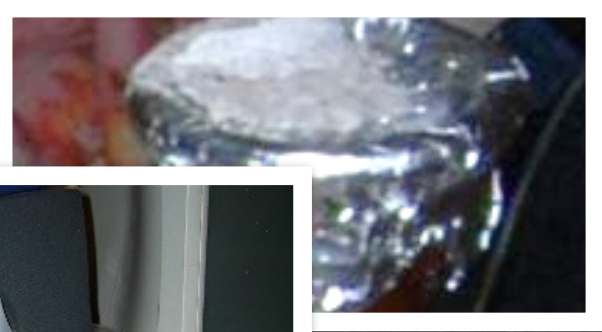
Computer Analysis

- Search: Cyanuric acid, cyanide
- Google Searches:
 - 4/27/2024
 - 6:36 pm – cyanide thiocyanate
 - 4/28/2024
 - 6:29 am - cyanide
 - 8:43 am - internet poisoning
 - 9:39 am - cyanuric acid
 - 9:51 am - anarchists cookbook



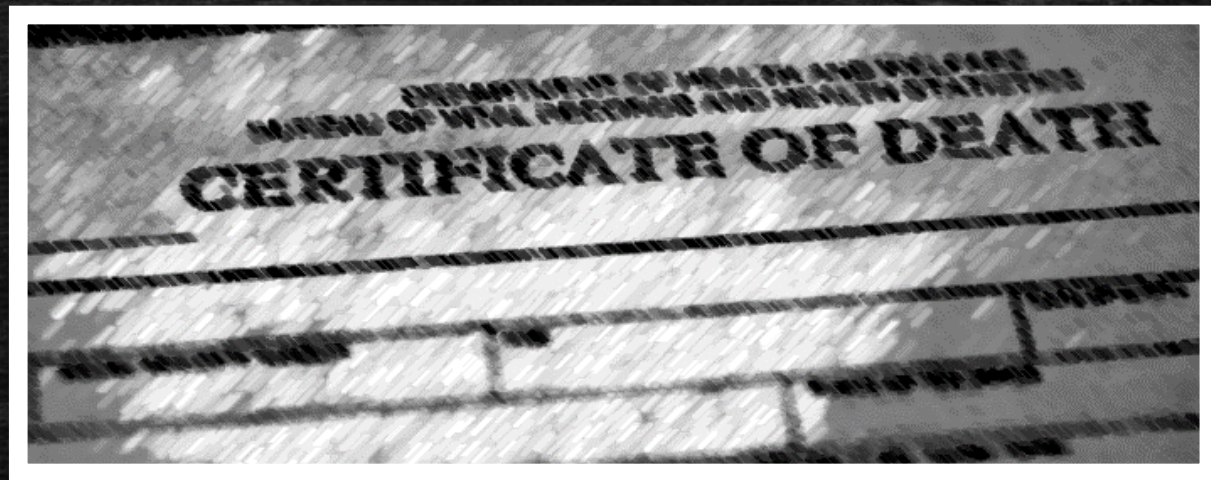
Cyanide Production

- Heat sodium bicarbonate to convert it to the sodium carbonate.
– Heat $2 \text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
- Combine cyanuric acid with the still-warm sodium carbonate and thoroughly stir the two powders together with a spoon or wire
– Heat $2 \text{HOCN} + \text{Na}_2\text{CO}_3 \rightarrow 2 \text{NaOCN} + \text{CO}_2 + \text{H}_2\text{O}$
- The sodium cyanate will then be reduced with carbon at high temperatures to form sodium cyanide and carbon monoxide. The carbon monoxide gas of course also escapes.
- Heat $\text{NaOCN} + \text{C} \rightarrow \underline{\text{NaCN}} + \text{CO}$



Chapter 5:

The Final Chapter



Toxicology

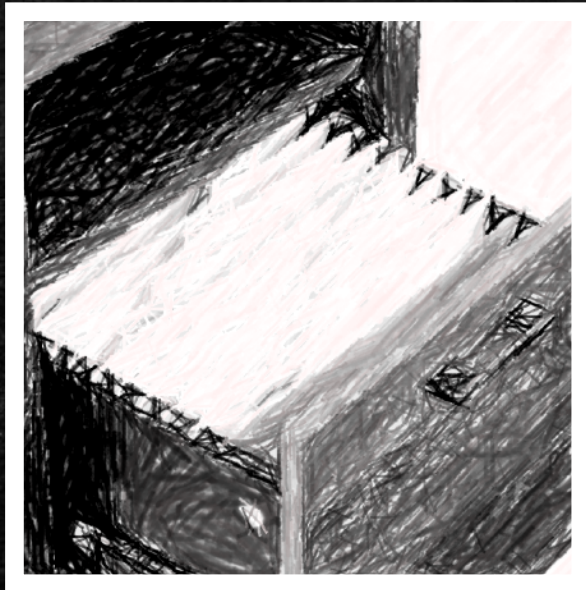
- Blood cyanide level: 12 mg/L
 - Normal:
 - Nonsmokers: 0.025 mg/L
 - Smokers: 0.41 mg/L
 - Fatal: > 1 mg/L



Lessons Learned

- COD & MOD

- Acute cyanide toxicity
- Suicide



- The Why?

- Recent trouble with law (DUI)
- Recently lost job
- Recently broke up with GF
- Financial troubles
- History of depression
- History of chronic EtOH abuse
- Previous suicide attempt

The End

Coming Soon!
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