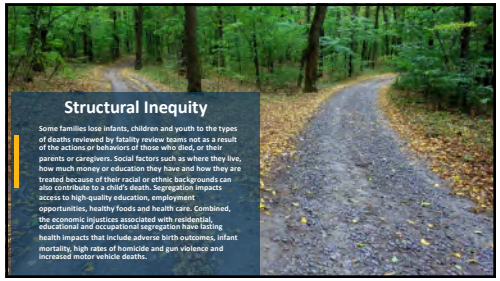
What has the Sudden Unexpected Infant Death (SUID) and Sudden Death in the Young (SDY) Case Registry Learned About Consenting Families for DNA Banking and/or Genomic Research?

Heather MacLeod, MS and Erik Buczkowski, MPH
Data Coordinating Center for the SUID and SDY Case Registry

SDY
DATA COORDINATING CENTER FOR THE SUDDEN DEATH IN THE YOUNG CASE REGISTRY

1



2

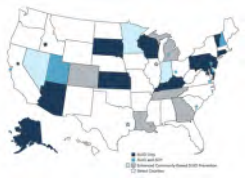
Sudden Unexpected Infant Death (SUID) and Sudden Death in the Young (SDY) Case Registry Goals

- Gather comprehensive data on Sudden Death in the Young (Ages 0-20*) Since 2015
  - Count the number and types of sudden deaths up to age 20*
- Understand the causes and risk factors
- Inform ways to prevent these deaths

*depends on state Child Death Review legislation

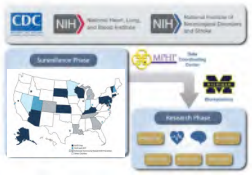
3

Current States/Jurisdictions Participating



4

Research and Collaborations



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Surveillance Progress

- Surveillance began in January 2015 in up to 13 States/Jurisdictions
  - 5667 cases identified
  - About 70% less than 1 year of age

6

SUID and SDY Case Process

7

SUID and SDY Consent Process

- Next of Kin (NOK)/Legally Authorized Representative (LAR) contact information (cell phone and email preferred) obtained during death investigation
- Contact information sent to person attempting consent
- Family contacted. If unsuccessful, utilize other times and contact methods
- Offer family bereavement support and resources
- Share information about SUID and SDY Case Registry and offer opportunity to bank DNA and/or participate in research

8

SUID and SDY Consent Training and Resources

- Data Coordinating Center (DCC) provides one-on-one training for awardees
- Consent can be attempted:
  - in person
  - by phone
  - via email (e-consent on computer, tablet, or mobile device)
- *Multiple languages available for print version of consent (Arabic, Cambodian, Chinese (Simplified), French, Haitian Creole, Portuguese, Russian, Somali, Vietnamese).
- *Telephone script and bereavement outreach timeline

*Resources from Philadelphia Medical Examiner Office

9

Consent Research Results

Overall	• Overall consent rate: 11%. Range across sites is 3% to 66%
Timeline	• 54% consented within 60 days • 39% within 48 hours
Method	• Consent types: paper-based (73%), telephonic (23%), electronic (4% available since Fall 2021)
Personnel	• Highest consent rates with MEO personnel attempting (social workers, death investigators)
Outsourcing	• Low success (3%) with contracted genetic counseling companies

10

Best Practices

- Involve people in medical examiner offices in developing and maintaining consent process
- Utilize a Death investigator or someone else from the death investigation team or support staff (bereavement specialist or social worker) already interacting with the family to attempt consent

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Best Practices

- Person attempting consent is comfortable and confident talking to grieving families
- Attempts are made early and often
- Accurate contact information (cell phone and email) is collected by death investigator and shared with the person attempting consent

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SUID and SDY Case Registry Publications and Resources

- SDY Publications: https://sdyregistry.org/research/
- Comprehensive information compiled in the National Fatality Review Case Reporting System available for:
  - 5021 categorized and completed SDY cases
  - Accruing at the rate of about 750 identified SDY cases in the Registry each year
- 294 genomes available in dbGaP at: "Sudden Death in the Young Case Registry – Parent Study"
- Autopsy reports available on select cases (148 since Winter 2019)

13

Acknowledgements

Centers for Disease Control and Prevention (CDC) Carrie Shapiro-Mendoza, Carri Cottengim, Alexa Erck Lambert, Sharyn Parks-Brown, Tiffany Colarusso, and Niu Tian

MPHI National Center for Fatality Review and Prevention Heather Dykstra, Gabby Fraley, Susanna Joy, Esther Shaw, Abby Collier, Sasha Mintz, Gretchen Martin and Dan Litvinoff

National Institutes of Health (NIH) Kristin Burns and Vicky Whittemore

MPHI Data Coordinating Center and University of Michigan Biorepository Erik Buczkowski, Meghan Faulkner, Krisha Felzke, Sarah Geisler, Heather MacLeod, Mark Russell

SUID and SDY Case Registry States/Jurisdictions States: Delaware, Indiana, Minnesota, Nevada, New Hampshire, New Mexico and Utah Jurisdictions: San Francisco County (CA), select counties in Michigan, Pennsylvania, Tennessee, Virginia and Wisconsin

14

Acknowledgements

SDY Advisory Committee
Lisa Bateman, Robert Campbell, Sumeet Chugh, Laura Crandall, Sam Gulino, Gardiner Lapham, Martha Lopez-Anderson, Kurt Nolte and Vicki Vetter

SDY Autopsy Protocol Committee
Karen Chancellor, Beau Clark, Tim Corden, Kim Fallon, Corinne Fligner, Sam Gulino, Wendy Gunther, Jennifer Hammers, Owen Middleton and Michael Murphy

SDY Ethicists
Amy McGuire and Sonia Suter

15

Acknowledgements
SUID and SDY Case Registry Data Coordinting Center Funding

The SUID and SDY Case Registry Data Coordinating Center is funded by the U.S. Centers for Disease Control and Prevention (CDC) (contract # 75D30118C03074) and the National Institutes of Health (NIH) (contract # 75N92019C00003).

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sdyregistry.org

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Thank you!

We are grateful for your interest and engagement.

Together, we are supporting families and advancing research.

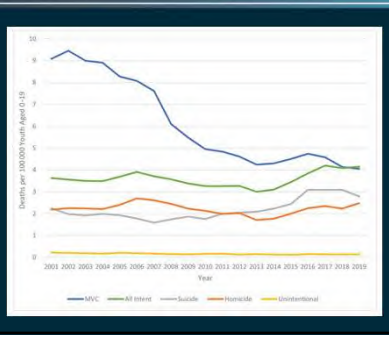
18

Characteristics of Pediatric Firearm-Related Fatalities in Harris County, Texas

Michelle McDonald DO, Forensic Pathology Fellow
Marianne E. Beynon MD, Assistant Medical Examiner

HARRIS COUNTY INSTITUTE OF FORENSIC SCIENCES
HOUSTON, TEXAS
SCIENCE | SERVICE | INTEGRITY

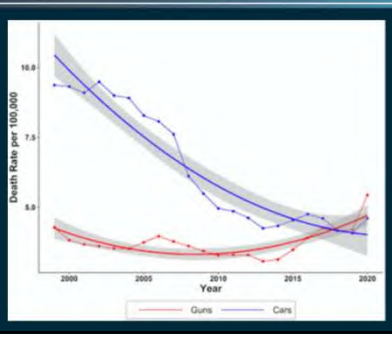
Pediatric Firearm Injury vs. MVC Mortality



2 Andrews AL, Killings X, Oddo ER, et al. Pediatric Firearm Injury Mortality Epidemiology. Pediatrics. 2022 Mar 1;149(3):e2021052739. doi: 10.1542/peds.2021-052739. Erratum in: Pediatrics. 2022 May 30;:. Erratum in: Pediatrics. 2022 Aug 1;150(2): PMID: 35224633.

Pediatric Firearm Injury vs. MVC Mortality

- By 2020, firearm injury fatality rates were 16% higher than automobile fatalities



3 Stevens J, Pickett K, Reppucci ML, Nolan M, Moulton SL. National trends in pediatric firearm and automobile fatalities. J Pediatr Surg. 2023 Jan;58(1):130-135. doi: 10.1016/j.jpedsurg.2022.09.028. Epub 2022 Sep 26. PMID: 36307297.

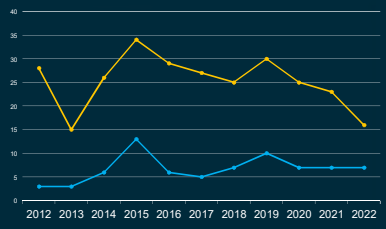
Pediatric Firearm Injury vs. MVC Mortality, Harris County

- From 2012 to 2022, there were 74 firearm-related deaths of juveniles less than 13 years old in Harris County, Texas
- Total MVC-related deaths of same population over the same time period: 166

4

Pediatric Firearm Injury vs. MVC Mortality, Harris County

Year	Total firearm related deaths	Total MVA related deaths
2012	3	25
2013	3	12
2014	6	20
2015	13	21
2016	6	23
2017	5	22
2018	7	18
2019	10	20
2020	7	18
2021	7	16
2022	7	9



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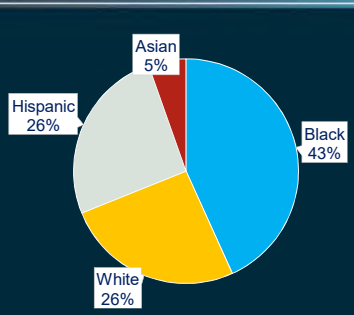
Firearm-related Fatalities: Demographics

- 52 males and 22 females
- Average age: 7.1 years
- 32 Black, 19 White, 19 Hispanic, and 4 Asian



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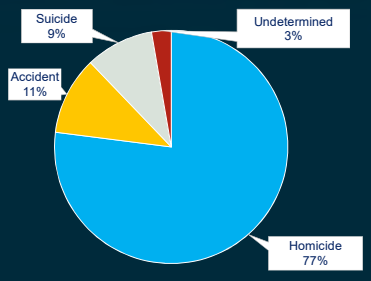
Firearm-related Fatalities: Manner

- Homicide: 57
- Accident: 8
- Suicide: 7
- Undetermined: 2



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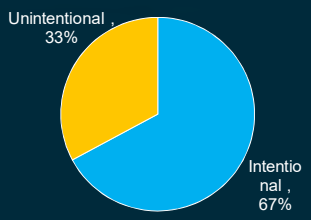
Firearm-related Fatalities: Suicide

- 10 WM – shot 14 y/o sister multiple times before shooting self
- 11 WM – familiar with guns, obtained mother's gun kept in nightstand, recently grounded due to bad grades
- 11 BM – at maternal uncle's, obtained rifle from uncle's bedroom
- 11 WM – history of mental health issues including suicidal ideation; obtained step-father's gun from closet
- 12 BM – history of mental health issues including suicide attempt ~3 years prior; obtained mother's gun from gun case kept under her bed (normally padlocked)
- 12 WM – obtained gun from toolbox in garage (normally kept locked)
- 12 HM – obtained gun from locked box in parent's bedroom (decedent knew where key for box was located)

8

Firearm-related Fatalities: Non-Suicidal

- Intentional: 45
- Unintentional: 22



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Unintentional Deaths

- **Average age for unintentional incident decedents: 5.5 years**
  - compared to 7.3 years for intentional and 11.3 for suicide
- **Nine cases involved juveniles shooting themselves**
- **7 were shot by a relative**
  - 6 by a sibling (ages ranging 3 - 13 years)
  - 1 by a cousin (9 year old)
- **4 by a friend (unspecified age ranges)**
- **2 cases shooter (decedent vs. other juvenile) was unable to be determined**

10

Unintentional Deaths

- **All 22 unintentional cases involved single gunshot wounds**
  - 14 head
  - 8 torso
- **Range:**
  - 1 contact
  - 8 close
  - 10 intermediate
  - 3 indeterminate

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Unintentional Deaths

- **Access to unsecured, loaded firearms was the critical factor noted in the majority of these cases**
  - Studies have shown that public health efforts targeting safer gun storage and legislative actions leading to penalties for unsafe storage-related incidents are effective at reducing unintentional firearm-related injuries
- **Locations other than the decedents' primary residences were often involved**
  - Public health initiatives directed towards grandparents/other family/friends a juvenile may spend time with can be considered for future campaigns

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Intentional Deaths

- 25 deaths in our cohort were related to family violence
- 20 were 'bystander' incidents (e.g., during a robbery, drive-by, home invasion, etc.)

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Intentional Deaths

- The gunshot wounds were more complicated in this subset.
- Number of GSWs:
  - 30 cases involved 1 GSW
  - 7 involved 2 GSWs
  - 6 involved 3 GSWs
  - 2 involved 5 GSWs
- Ranges:
  - 3 contact
  - 3 close
  - 9 intermediate
  - 19 indeterminate

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Intentional Deaths

- Body locations:
  - 39 head
  - 16 torso
  - 6 upper extremity
  - 3 neck
  - 2 hip

15

Intentional, Perpetrators of family violence incidents:

- **3 decedents were shot by their mother**
  - single incident
- **6 decedents were shot by their fathers**
  - five incidents
- **1 decedent was shot by a parent**
  - unable to determine if mother or father was perpetrator; all deceased
- **8 decedents were shot by their mother's boyfriend**
  - three incidents
- **1 decedent was shot by an individual hired by their mother's ex-partner**
- **3 decedents were shot by their uncle**
  - single incident
- **2 decedents were shot by their step-brother**
- **1 decedent was shot by a family friend.**

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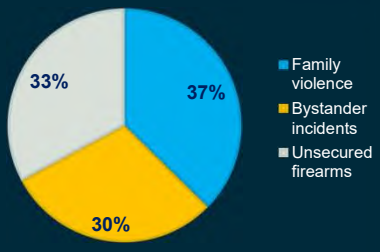
Firearm-related Fatalities: Risk Factors

- **Family violence: 25**
- **Bystander incidents: 20**
- **Unsecured firearms: 22**



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Conclusion

- **Our analysis has identified four major categories which can be targeted by public health campaigns in order to reduce pediatric firearm-related fatalities:**
  - Family violence
  - Juvenile access to unsecured, loaded firearms
  - 'Bystander' incidents
  - Suicide

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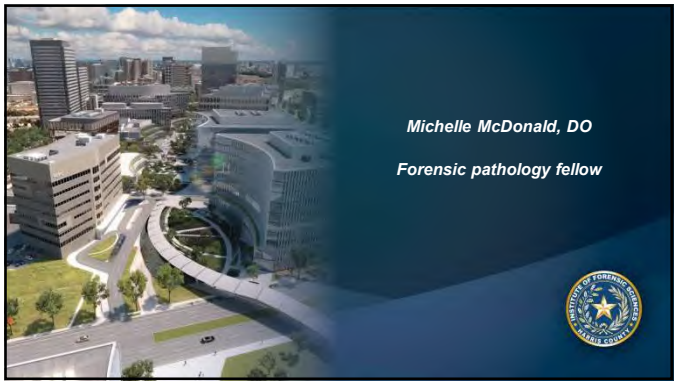

Michelle McDonald, DO
Forensic pathology fellow

POST-ADAPTATION: A COMPREHENSIVE REVIEW OF SUDDEN UNEXPECTED INFANT DEATHS IN ARKANSAS INVOLVING AN UNSAFE SLEEP ENVIRONMENT

PROCEDURAL GUIDANCE AND KEY CONSIDERATIONS

1

Presented by:

Teddi Tubre, M.D.

Co-author: Christy Cunningham, D.O.

Associate Medical Examiner
Arkansas State Crime Laboratory
Department of Public Safety

2

OBJECTIVES

- Review elements of an effective synoptic report.
- Identify accidental and undetermined infant deaths in Arkansas.
- Understand the common extrinsic and intrinsic factors involved in unexplained pediatric deaths.
- Discuss impact of synoptic reporting on Arkansas Child Death Review teams and stakeholders.

3

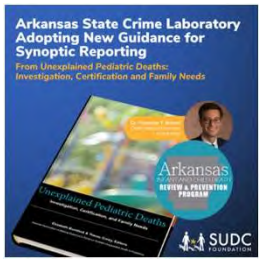
WHAT'S THE ISSUE?

- 2020 US documented 3,400 sudden and unexpected infant deaths (SUID).
- 27 states with rates above the national average 91.7 per 100,000 live births), AR being one of the highest.
- 2022 Arkansas documented 90 infant deaths.

4

SUDC Foundation
4 hrs

Dr. Theodore T. Brown, the chief medical examiner of Arkansas at the Arkansas State Crime Laboratory will be announcing their adoption of the new guidance for synoptic reporting from "Unexplained Pediatric Deaths: Investigation, Certification and Family Needs." Dr. Brown will be presenting the information at the state's annual training program for multiple stakeholders in Little Rock. The SUDC Foundation strongly encourages all states to adopt the guidance to support comprehensive investigations and improve surveillance of sudden infant and child deaths throughout the country.



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SPECTRUM OF PEDIATRIC DEATHS

- Explained Natural
- Explained Unnatural (Accidents, Homicides)
- Unexplained (Undetermined, Sudden Unexplained Infant Death, Sudden Infant Death Syndrome)
  - **Intrinsic factors**:
    - Prematurity/Small for gestational age/Low birth weight
    - Concurrent non-lethal illness (viral pneumonitis)
    - Gene variants of unknown significance
  - **Extrinsic factors**:
    - Unsafe sleep surface (adult bed, soft/adult/excessive bedding) or Over-bundling
    - Side or prone sleeping
    - Co-sleeping/Sleep surface sharing (1 or more adult(s)/children/animal(s))

6

Fillable PDF of Synoptic Reporting Form Available at ***sudpeds.com***

Page 1


Synoptic Report for Sudden Unexpected Pediatric Death

Page 2


Synoptic Report for Sudden Unexpected Pediatric Death (Continued)

7

UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:

Cause of Death
Choose an item.
Manner of Death
Choose an item.

AUTOPSY AND INVESTIGATIVE FINDINGS

1. **Investigation -** Choose an item.
2. **Medical History -** Choose an item.
3. **Sleep Environment Concerns -** Choose an item.
4. **Other Environmental Concerns -** Choose an item.
5. **Other Objective Concerns -** Choose an item.
6. **Autopsy -** Choose an item.
7. **Toxicology -** Choose an item.
8. **Ancillary studies – DONE/NOT DONE** (insert results if done)
   a. Bacterial cultures – DONE/NOT DONE
   b. Viral studies – DONE/NOT DONE
   c. Vitreous electrolytes – DONE/NOT DONE
   d. Genetic cardiac studies – DONE/NOT DONE
   e. Metabolic screen – DONE/NOT DONE
9. **Radiologic studies -** Choose an item.
10. **Additional comments -**

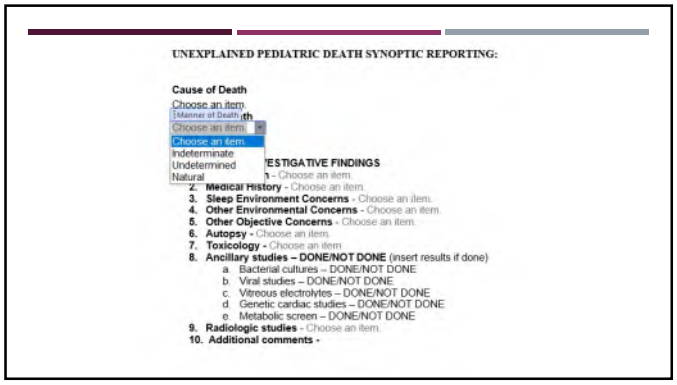
8

UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:

Cause of Death **th**
Choose an item.
- Choose an item.
- CAUSE OF DEATH
- Unexplained Sudden Death (No Identified Intrinsic or Extrinsic Factors)
- Unexplained Sudden Death (Intrinsic Factor[s] Identified)
- Unexplained Sudden Death (Extrinsic Factor[s] Identified)
- Unexplained Sudden Death (Intrinsic and Extrinsic Factors Identified)
- Undetermined (Not further specified)
- Undetermined (Insufficient data)

4. **Other Environmental Concerns** - Choose an item.
5. **Other Objective Concerns** - Choose an item.
6. **Autopsy -** Choose an item.
7. **Toxicology -** Choose an item.
8. **Ancillary studies – DONE/NOT DONE** (insert results if done)
   a. Bacterial cultures – DONE/NOT DONE
   b. Viral studies – DONE/NOT DONE
   c. Vitreous electrolytes – DONE/NOT DONE
   d. Genetic cardiac studies – DONE/NOT DONE
   e. Metabolic screen – DONE/NOT DONE
9. **Radiologic studies** - Choose an item.
10. **Additional comments -**

9


UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:
Cause of Death
Choose an item.
Manner of Death
Choose an item.
Choose an item.
Indeterminate
Undetermined
Natural
ESTIGATIVE FINDINGS
- Choose an item.
2. Medical History - Choose an item.
3. Sleep Environment Concerns - Choose an item.
4. Other Environmental Concerns - Choose an item.
5. Other Objective Concerns - Choose an item.
6. Autopsy - Choose an item.
7. Toxicology - Choose an item.
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b. Viral studies – DONE/NOT DONE
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10. Additional comments -

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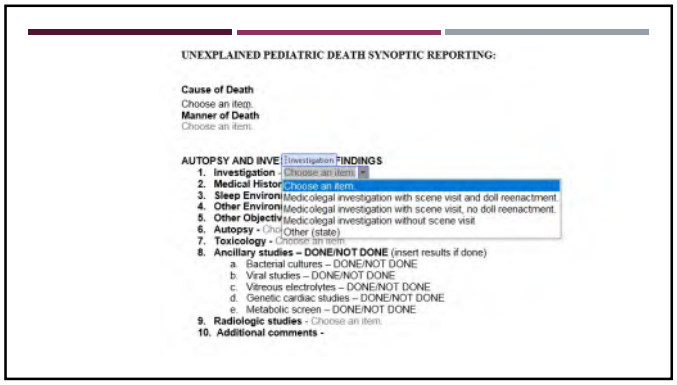
UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:
Cause of Death
Choose an item.
Manner of Death
Choose an item.
AUTOPSY AND INVE
Investigation
FINDINGS
1. Investigation - Choose an item.
2. Medical Histor
Choose an item.
3. Sleep Environ
Medicolegal investigation with scene visit and doll reenactment.
4. Other Environ
Medicolegal investigation with scene visit, no doll reenactment.
5. Other Objectiv
Medicolegal investigation without scene visit
6. Autopsy - Cho
Other (state)
7. Toxicology - Choose an item.
8. Ancillary studies – DONE/NOT DONE (insert results if done)
a. Bacterial cultures – DONE/NOT DONE
b. Viral studies – DONE/NOT DONE
c. Vitreous electrolytes – DONE/NOT DONE
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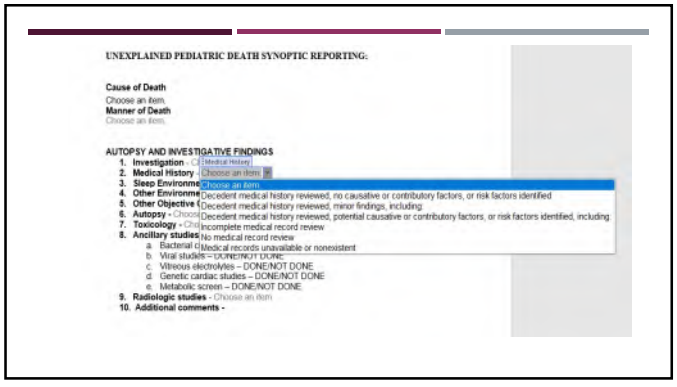
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Manner of Death
Choose an item.
AUTOPSY AND INVESTIGATIVE FINDINGS
1. Investigation - C
Medical History
2. Medical History -
Choose an item.
3. Sleep Environme
Choose an item.
4. Other Environme
Decedent medical history reviewed, no causative or contributory factors, or risk factors identified
5. Other Objective C
Decedent medical history reviewed, minor findings, including:
6. Autopsy - Choos
Decedent medical history reviewed, potential causative or contributory factors, or risk factors identified, including:
7. Toxicology - Cho
Incomplete medical record review
8. Ancillary studies
No medical record review
a. Bacterial C
Medical records unavailable or nonexistent
b. Viral studies – DONE/NOT DONE
c. Vitreous electrolytes – DONE/NOT DONE
d. Genetic cardiac studies – DONE/NOT DONE
e. Metabolic screen – DONE/NOT DONE
9. Radiologic studies - Choose an item.
10. Additional comments -

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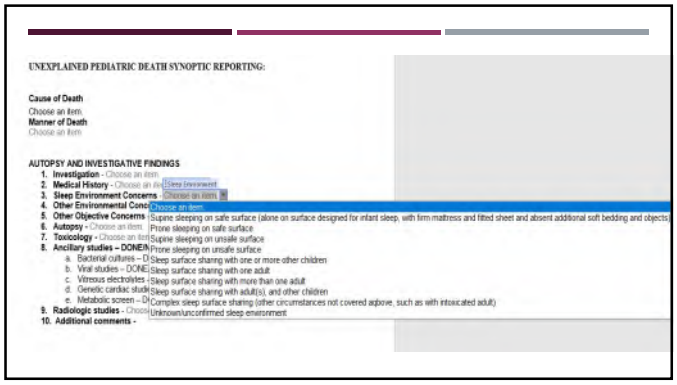
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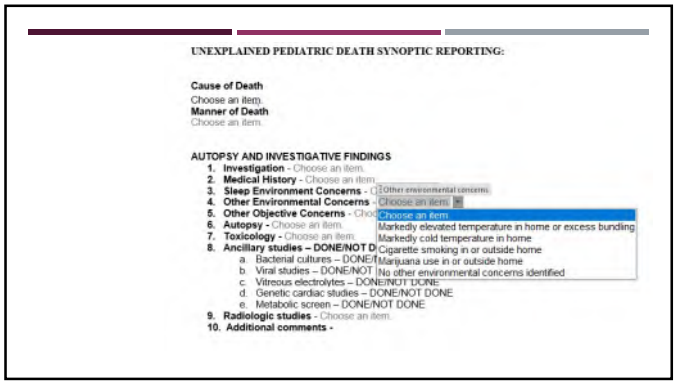
3. Sleep Environment Concerns - Choose an item.
4. Other Environmental Conc
5. Other Objective Concerns
6. Autopsy - Choose an item.
7. Toxicology - Choose an item.
8. Ancillary studies – DONE/N
a. Bacterial cultures – D
b. Viral studies – DONE
c. Vitreous electrolytes -
d. Genetic cardiac studi
e. Metabolic screen – D
9. Radiologic studies - Choos
10. Additional comments -
Choose an item.
Supine sleeping on safe surface (alone on surface designed for infant sleep, with firm mattress and fitted sheet and absent additional soft bedding and objects)
Prone sleeping on safe surface
Supine sleeping on unsafe surface
Prone sleeping on unsafe surface
Sleep surface sharing with one or more other children
Sleep surface sharing with one adult
Sleep surface sharing with more than one adult
Sleep surface sharing with adult(s) and other children
Complex sleep surface sharing (other circumstances not covered aqbove, such as with intoxicated adult)
Unknown/unconfirmed sleep environment

13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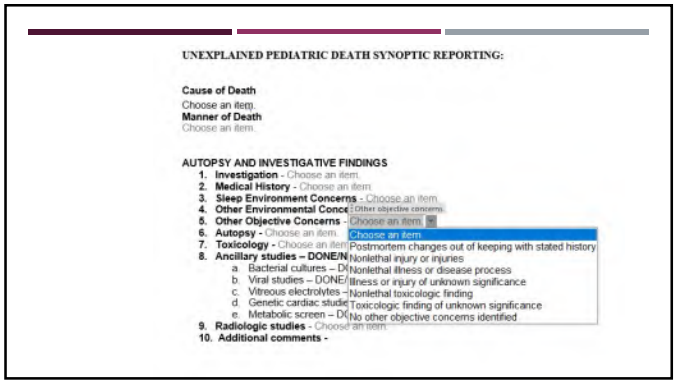
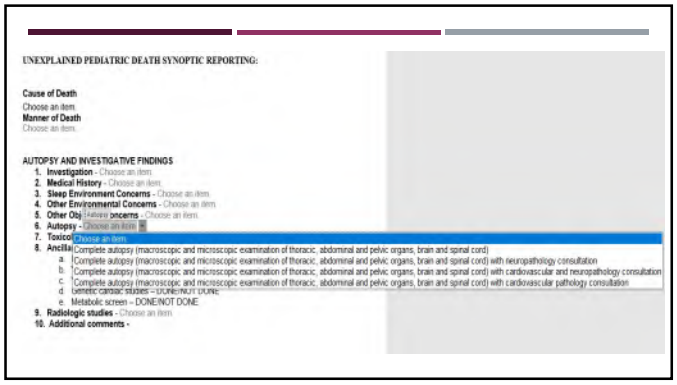
5. Other Objective Concerns -
6. Autopsy - Choose an item.
7. Toxicology - Choose an item.
8. Ancillary studies – DONE/NOT D
a. Bacterial cultures – DONE/
b. Viral studies – DONE/NOT
c. Vitreous electrolytes – DONE/NOT DONE
d. Genetic cardiac studies – DONE/NOT DONE
e. Metabolic screen – DONE/NOT DONE
9. Radiologic studies - Choose an item.
10. Additional comments -
Other environmental concerns.
Choose an item.
Markedly elevated temperature in home or excess bundling
Markedly cold temperature in home
Cigarette smoking in or outside home
Marijuana use in or outside home
No other environmental concerns identified

14


UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:
Cause of Death
Choose an item.
Manner of Death
Choose an item.
AUTOPSY AND INVESTIGATIVE FINDINGS
1. Investigation - Choose an item.
2. Medical History - Choose an item.
3. Sleep Environment Concerns - Choose an item.
4. Other Environmental Conce
5. Other Objective Concerns - Choose an item.
6. Autopsy - Choose an item.
7. Toxicology - Choose an item.
8. Ancillary studies – DONE/N
a. Bacterial cultures – D
b. Viral studies – DONE/
c. Vitreous electrolytes –
d. Genetic cardiac studie
e. Metabolic screen – D
9. Radiologic studies - Choose an item.
10. Additional comments -
Other objective concerns.
Choose an item.
Postmortem changes out of keeping with stated history
Nonlethal injury or injuries
Nonlethal illness or disease process
Illness or injury of unknown significance
Nonlethal toxicologic finding
Toxicologic finding of unknown significance
No other objective concerns identified

15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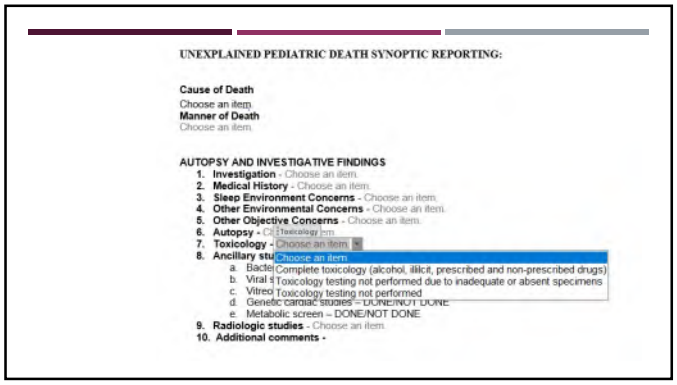
3. Sleep Environment Concerns - Choose an item.
4. Other Environmental Concerns - Choose an item.
5. Other Obj
oncerns - Choose an item.
6. Autopsy - Choose an item.
7. Toxicol
Choose an item.
8. Ancilla
Complete autopsy (macroscopic and microscopic examination of thoracic, abdominal and pelvic organs, brain and spinal cord)
Complete autopsy (macroscopic and microscopic examination of thoracic, abdominal and pelvic organs, brain and spinal cord) with neuropathology consultation
Complete autopsy (macroscopic and microscopic examination of thoracic, abdominal and pelvic organs, brain and spinal cord) with cardiovascular and neuropathology consultation
Complete autopsy (macroscopic and microscopic examination of thoracic, abdominal and pelvic organs, brain and spinal cord) with cardiovascular pathology consultation
d.
e. Metabolic screen – DONE/NOT DONE
9. Radiologic studies - Choose an item.
10. Additional comments -

16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Manner of Death
Choose an item.
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2. Medical History - Choose an item.
3. Sleep Environment Concerns - Choose an item.
4. Other Environmental Concerns - Choose an item.
5. Other Objective Concerns - Choose an item.
6. Autopsy -
7. Toxicology - Choose an item.
Choose an item.
Complete toxicology (alcohol, illicit, prescribed and non-prescribed drugs)
Toxicology testing not performed due to inadequate or absent specimens
Toxicology testing not performed
8. Ancillary stu
a. Bacte
b. Viral
c. Vitreo
d. Genetic cardiac studies – DONE/NOT DONE
e. Metabolic screen – DONE/NOT DONE
9. Radiologic studies - Choose an item.
10. Additional comments -

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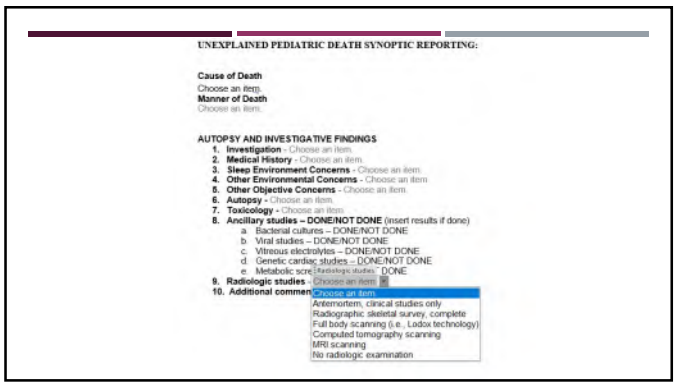
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5. Other Objective Concerns - Choose an item.
6. Autopsy - Choose an item.
7. Toxicology - Choose an item.
8. Ancillary studies – DONE/NOT DONE (insert results if done)
a. Bacterial cultures – DONE/NOT DONE
b. Viral studies – DONE/NOT DONE
c. Vitreous electrolytes – DONE/NOT DONE
d. Genetic cardiac studies – DONE/NOT DONE
e. Metabolic scre
Radiologic studies - Choose an item.
9. Radiologic studies - Choose an item.
10. Additional commen
Choose an item.
Antemortem, clinical studies only
Radiographic skeletal survey, complete
Full body scanning (i.e., Lodox technology)
Computed tomography scanning
MRI scanning
No radiologic examination

18

UNEXPLAINED PEDIATRIC DEATH SYNOPTIC REPORTING:

Cause of Death

Choose an item.

Manner of Death

Choose an item.

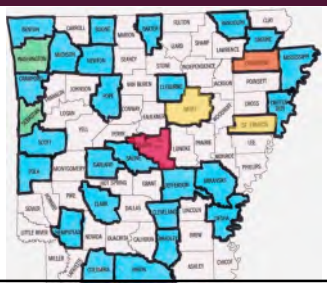
AUTOPSY AND INVESTIGATIVE FINDINGS

1. **Investigation -** Choose an item.
2. **Medical History -** Choose an item.
3. **Sleep Environment Concerns -** Choose an item.
4. **Other Environmental Concerns -** Choose an item.
5. **Other Objective Concerns -** Choose an item.
6. **Autopsy -** Choose an item.
7. **Toxicology -** Choose an item.
8. **Ancillary studies – DONE/NOT DONE** (insert results if done)
   a. Bacterial cultures – DONE/NOT DONE
   b. Viral studies – DONE/NOT DONE
   c. Vitreous electrolytes – DONE/NOT DONE
   d. Genetic cardiac studies – DONE/NOT DONE
   e. Metabolic screen – DONE/NOT DONE
9. **Radiologic studies -** Choose an item.
10. **Additional comments -**

19

2022 ARKANSAS: PEDIATRIC DEATHS

UNDETERMINED/UNEXPLAINED SUDDEN INFANT DEATHS BY COUNTY



Color Key

Number of Cases per County

Red:	**11-cases**
Orange:	**5-cases**
Yellow:	**4-cases**
Green:	**3-cases**
Blue:	**≤2-cases**

20

2022 ARKANSAS: PEDIATRIC DEATHS

MANNER OF DEATH & UNSAFE SLEEP ENVIRONMENT

- 90 infant deaths of which the ***manner of death*** was classified as ***accidental*** (17%) or ***undetermined*** (70%).
- **Accidental** deaths: 87% identified as associated with unsafe sleep environment.
- **Undetermined** deaths: 84% identified as associated with unsafe sleep environment.
  - 10% Unknown/Unclear if unsafe sleep environment
  - 6% Other Circumstances

21

2022 ARKANSAS: PEDIATRIC DEATHS
UNDETERMINED MANNER OF DEATH & CAUSE OF DEATH STATEMENT

- Of 63 infant deaths with an *undetermined manner of death*, in which ***cause of death*** was classified as:
  - ***Unexplained Sudden Death*** (81%).
  - ***Undetermined*** (17%).

22

2022 ARKANSAS: PEDIATRIC DEATHS
CAUSE OF DEATH - EXTRINSIC & INTRINSIC FACTORS

- ***"Unexplained Sudden Death" -*** Only Extrinsic Factor(s) Identified: 20%
- ***"Unexplained Sudden Death" -*** Only Intrinsic Factor(s) Identified: 4%
- ***"Unexplained Sudden Death" -*** Extrinsic and Intrinsic Factor(s) Identified: 76%

- ***"Undetermined" -*** Only Extrinsic Factor(s) Identified: 9%
- ***"Undetermined" -*** Only Intrinsic Factor(s) Identified: 45%
- ***"Undetermined" -*** Extrinsic and Intrinsic Factor(s) Identified: 36%

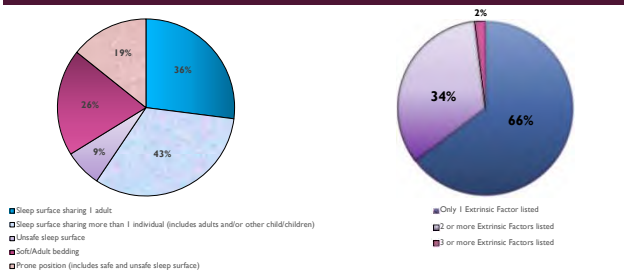
23

2022 ARKANSAS: PEDIATRIC DEATHS
EXTRINSIC & INTRINSIC FACTORS IDENTIFIED

- Of the cases in which *Extrinsic* and/or *Intrinsic Factors* were identified:
  - Most common *Extrinsic Factor*: Sleep surface sharing with one adult (36%)
    - 66% cases listed only 1 EF
    - 34% of cases listed 2 or more EFs
    - 2% cases listed 3 or more EFs
  - Most common *Intrinsic Factor*: Pneumonitis/Pneumonia (58%)
    - 69% cases listed only 1 IF
    - 31% of cases listed 2 or more IFs
    - 6% cases listed 3 or more IFs

24

FOCUS ON EXTRINSIC FACTORS



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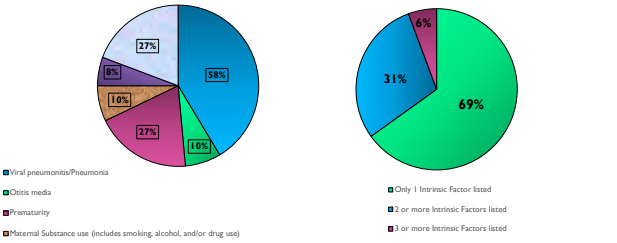
FOCUS ON INTRINSIC FACTORS



26

EARLY FEEDBACK
ARKANSAS CHILD DEATH REVIEW TEAMS

PROs	CONs
• Standardized synoptic reporting for consistency in classification for certification of cause and manner of death.	• Expand DC to list extrinsic and intrinsic factors.
• Concise investigation findings.	• Confusion with utilization of "*unexplained*" terminology.

"Synoptic reporting and death certification criteria has highlighted high risk factors associated with SUID deaths making them more easily identifiable."

27

STEPPING INTO DANGER

EXPLORING RISK FACTORS FOR OLDER PEDESTRIANS

Mahmuod Abdeljaber, MD, PharmD
Yvonne Hojberg, BA
Daniel Brauner, MD
Joyce deJong, DO

1

BACKGROUND

- Walking is an essential means of transport – also:
  - Provides numerous health benefits
  - Tied to 40% of preventable road deaths globally (WHO, 2020)

2

BACKGROUND

- Pedestrian vs. vehicle fatalities disproportionately affect elderly persons (≥65)
  - CDC: 20% of all vehicle deaths, 17% of the population
- Older persons struck by vehicles face a higher risk of serious injury or
- Discovering risk factors opens a window into the causes

3

CROSSING A STREET INVOLVES COMPLEX DECISION-MAKING

Pay attention to vehicles ~~on~~ traveling in either direction

Estimating velocities and estimate time needed to cross
- Revaluate risks dynamically

4

POTENTIAL AGES WITH AGING

Problems with ambulation
- Motion detection challenges
- Decreased Reaction times
- Altered Anticipating collision timing
- Executive function decline Increased prevalence of arthritis
- Walking speed decreases
- Takes longer to initiate movement
- Motion detection changes
- Executive function decline

Visual changes
- Decreased acuity
- Decreased night vision
- Downward gaze tendency

5

METHODS

- Search of Medical Examiner database -->81 cases
  - Variables collected:
    - Time of day
    - Activity when hit
    - Presence of street crossing
    - Relevant medical history/medications
    - History of substance use
    - Tox report results
    - Contributory medical findings at autopsy

6

RESULTS

- Average age: 72 years old (range 60-96)
- 56 pedestrian vs. vehicle deaths on the road
- 5 deaths in parking lots
- 3 deaths from own vehicle
- 8 bicycle deaths
- 4 train deaths
- 5 cases where there was insufficient information (death happened many years after accident)

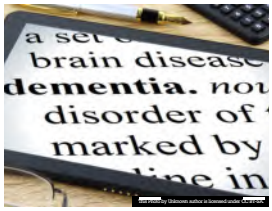
7

DEATH ON THE ROAD

- 9 deaths occurred while getting mail
  - 8 across the street
- 10/39 while crossing street occurred at designated street crossings
- Some occurred at street light locations/stop signs
- 24 daylight, 30 nighttime, 3 unknown
- 39/56 died within 24 hrs
- Most common vehicles
  - Sedan 21, SUV 13, Pickup 6
    - MI State Average:
      - SUVs: 48.6%
      - Sedans: 27.4%
      - Pickups: 18.1%

8

CONTRIBUTORY CAUSES



- PMH
  - 6 with dementia
  - 3 with schizophrenia
  - 1 with schizophrenia and dementia
  - 4 with known history of hearing/visual impairments

9

CONTRIBUTORY CAUSES – ASSISTIVE DEVICES

- Only 3 pedestrians hit were using walker or cane when hit
- Unknown number that needed a walker but did was not using one

10

CONTRIBUTORY CAUSES – TOXICOLOGY

- Toxicology
  - 17 true positives (not after hospital stay)
  - Alcohol (7), cocaine/meth (5), THC (4), opiates (4), benzos (1), diphenhydramine (1)

11

DEATH ON BICYCLES

- 8 total fatalities (~10%) involved bicyclists
- All deaths occurred on roads without bike lanes
- Two fatalities as part of a multiple fatality event
  - Intentional murder of 5 bicyclists.
  - No fatalities occurred on bike lanes or bike paths

12

SUMMARY

- Major risk factors for elderly vs. vehicle deaths:
  - Crossing at non-designated crossings
  - Accessing mailboxes located across the street
  - Concurrent mind-altering substance use

13

PREVENTING DEATHS

Cross walks	• Increasing the number of cross walks, especially at intersections
Bike paths and bike lanes	• Nationwide overhaul needed to protect bicyclists against road hazards • Improving infrastructure to accommodate bike paths and lanes

14

PREVENTING DEATHS

- Mailboxes
  - In 2020, junk mail accounted for 59% of all household mail (USPS "The Household Diary Study", 2020)
    - A significant number of the remainder is business that could be done on-line
    - Mail retrieval may be an unnecessary risk on most days
  - Mailboxes are placed across the street due to USPS route mapping
  - Placement of cross-walks and

15

REFERENCES

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Note: All citations were accessed on September 8, 2023.

16

QUESTIONS

17

IMPORTANCE OF FORENSIC PATHOLOGIST INVOLVEMENT IN THE MATERNAL MORTALITY REVIEW COMMITTEE

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Arkansas State Crime Laboratory, Department of Public Safety[1] and
University of Arkansas for Medical Sciences[2]
Little Rock, Arkansas

1

OUTLINE

- Maternal Mortality Discussion
- Maternal Mortality Review Teams
- Forensic Pathologist Experience on Maternal Mortality Review Team in Arkansas
- Active Engagement on Maternal Mortality Review Teams

2

MATERNAL MORTALITY

- Maternal Death, as defined by the World Health Organization: "The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."

3

Table. Number of live births, maternal deaths, and maternal mortality rates, by race and Hispanic origin and age: United States, 2018–2021

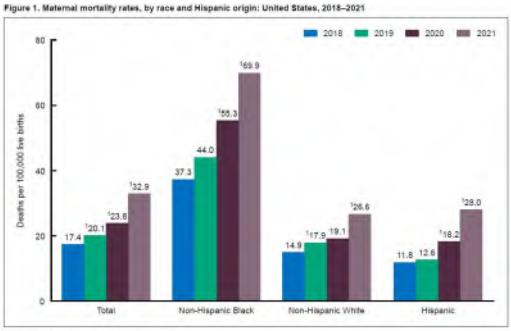
Race and Hispanic origin and age	2018			2019			2020			2021		
	Number of live births	Number of deaths	Maternal mortality rate[1]	Number of live births	Number of deaths	Maternal mortality rate[1]	Number of live births	Number of deaths	Maternal mortality rate[1]	Number of live births	Number of deaths	Maternal mortality rate[1]
Total[2]	3,791,712	658	17.4	3,747,540	754	20.1	3,613,647	861	23.8	3,664,292	1,205	32.9
Under 25	907,782	96	10.6	877,603	111	12.6	825,403	114	13.8	797,334	163	20.4
25–39	2,756,974	458	16.6	2,739,976	544	19.9	2,658,445	607	22.8	2,731,223	854	31.3
40 and over	126,956	104	81.9	129,761	98	75.5	129,799	140	107.9	135,735	188	138.5

[1]Maternal mortality rates are deaths per 100,000 live births.
[2]Includes deaths for race and Hispanic-origin groups not shown separately, including women of multiple races and origin not stated.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality and Mortality.

4

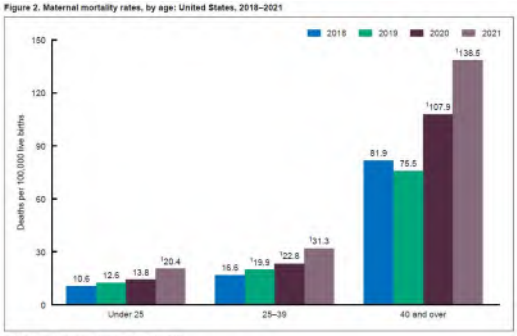
Figure 1. Maternal mortality rates, by race and Hispanic origin: United States, 2018–2021



†Statistically significant increase from previous year ($p < 0.05$).
NOTE: Race groups are single race.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

5

Figure 2. Maternal mortality rates, by age: United States, 2018–2021



†Statistically significant increase from previous year ($p < 0.05$).
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

6

EVALUATION OF MATERNAL DEATHS

- The literature reports several ways to categorize and evaluate the deaths of pregnant or postpartum women.
- For example, deaths are sometimes divided into direct maternal deaths, indirect maternal deaths, and incidental maternal deaths.
  - Direct maternal deaths result from complications of the pregnant state.
  - Indirect maternal deaths result from diseases that were worsened or developed due to the pregnant state.
  - Incidental maternal deaths are unrelated to the pregnant state (including accidental and intentional traumatic deaths).
- Worldwide, direct maternal deaths are most common, while in the United States, indirect maternal deaths are most common.
- Pregnant and postpartum deaths can also be classified by pathologic conditions and whether they are unique to pregnancy, associated with pregnancy, or exacerbated by pregnancy, with the caveat that there may be some overlap.

7

EVALUATION OF MATERNAL DEATHS

Unique to Pregnancy

- Hemorrhagic conditions (ruptured ectopic pregnancy, placenta previa, placenta abruption, uterine rupture, postpartum hemorrhage)
- Pregnancy-induced hypertension (preeclampsia and eclampsia)
- Hepatic disorders (intrahepatic cholestasis of pregnancy, acute fatty liver of pregnancy, and HELLP syndrome)

8

EVALUATION OF MATERNAL DEATHS

Associated with Pregnancy

- Pregnancy-associated cardiac disorders (peripartum cardiomyopathy, peripartum myocarditis, and pregnancy-associated spontaneous coronary artery dissection)
- Embolic disorders (pulmonary thromboembolism and air embolism)
- Thrombotic microangiopathies of pregnancy (thrombotic thrombocytopenia purpura and hemolytic uremic syndrome; disseminated intravascular coagulation)
- Endocrine disorders (gestational diabetes mellitus, pituitary insufficiency, and hyperpituitarism)
- Infectious diseases
- Gestational trophoblastic disease

9

EVALUATION OF MATERNAL DEATHS

Exacerbated by Pregnancy

- Cardiac diseases (congenital heart disease, acquired valvular disease, hypertensive cardiovascular disease, atherosclerotic cardiovascular disease, arrhythmogenic heart disease)
- Pulmonary diseases (primary pulmonary hypertension and asthmatic bronchitis)
- Hematologic diseases
- Neurologic disorders
- Complications of Anesthesia

Unnatural Maternal Deaths

- Accidents, Suicides, Homicides

10

ARKANSAS MATERNAL MORTALITY REVIEW TEAM

SECTION 2. Arkansas Code Title 20, Chapter 15, is amended to add an additional subchapter to read as follows:

Subchapter 23 — Maternal Mortality Review Committee

20-15-2301. Maternal Mortality Review Committee.

(a)(1) The Department of Health shall establish the Maternal Mortality Review Committee to review maternal deaths and to develop strategies for the prevention of maternal deaths.

(2) The committee shall be multidisciplinary and composed of members as deemed appropriate by the department.

(b) The department may contract with an external organization to assist in collecting, analyzing, and disseminating maternal mortality information, organizing and convening meetings of the committee, and other tasks as may be incident to these activities, including providing the necessary data, information, and resources to ensure successful completion of the ongoing review required by this section.

11

ARKANSAS MATERNAL MORTALITY REVIEW TEAM

20-15-2302. Powers and duties.

The Maternal Mortality Review Committee shall:

(1) Review pregnancy-associated deaths or deaths of women with indication of pregnancy up to three hundred sixty-five (365) days after the end of pregnancy, regardless of cause, to identify the factors contributing to these deaths;

(2) Identify maternal death cases;

(3) Review medical records and other relevant data;

(4) Contact family members and other affected or involved persons to collect additional relevant data;

(5) Consult with relevant experts to evaluate the records and data;

12

ARKANSAS MATERNAL MORTALITY REVIEW TEAM

(6) Make determinations regarding the preventability of maternal deaths;

(7) Develop recommendations for the prevention of maternal deaths, including public health and clinical interventions that may reduce these deaths and improve systems of care; and

(8) Disseminate findings and recommendations to policy makers, healthcare providers, healthcare facilities, and the general public.

20-15-2303. Access to records.

(a) Healthcare providers, healthcare facilities, and pharmacies shall provide reasonable access to the Maternal Mortality Review Committee to all relevant medical records associated with a case under review by the committee.

(b) A healthcare provider, healthcare facility, or pharmacy providing access to medical records as described by subdivision (a) of this section is not liable for civil damages or subject to any criminal or disciplinary action for good faith efforts in providing such records.

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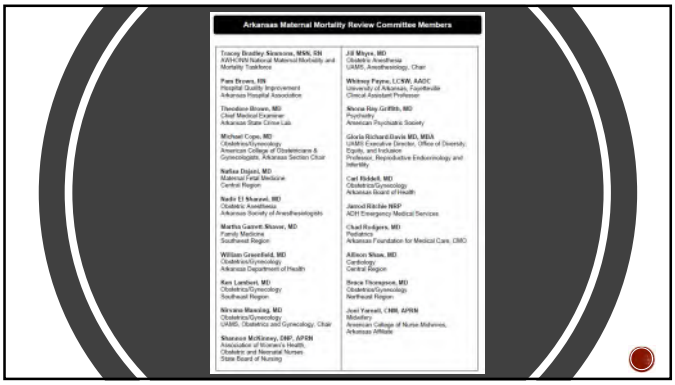

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MATERNAL MORTALITY REVIEW TEAM PROCESS

- Case Identification
  - Importance of Death Certificate
- Abstraction
- Meeting Structure
  - Was the death pregnancy related?
  - What was the underlying cause of death?
  - Was the death preventable?
  - What were the factors that contributed to the death?
  - What are the recommendations and actions that address those contributing factors?
  - What is the anticipated impact of those actions if implemented?

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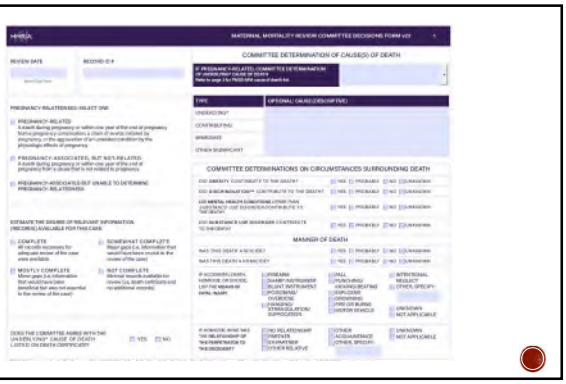
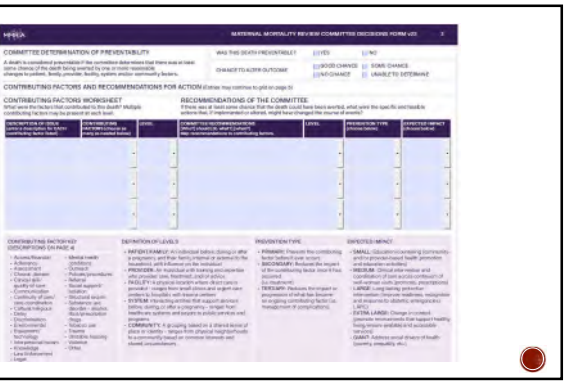
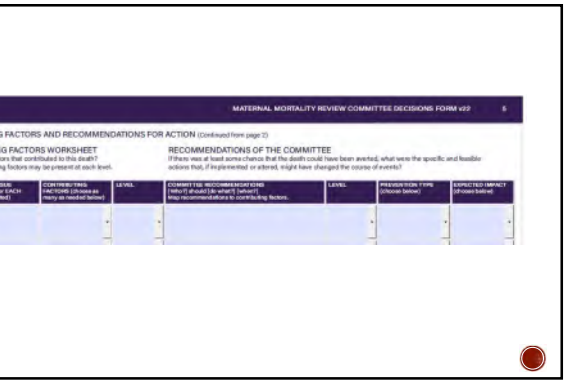

MMRIA
MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v22
COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH
COMMITTEE DETERMINATIONS ON CIRCUMSTANCES SURROUNDING DEATH
MANNER OF DEATH

16


MMRIA
MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v22
COMMITTEE DETERMINATION OF PREVENTABILITY
CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION
CONTRIBUTING FACTORS WORKSHEET
RECOMMENDATIONS OF THE COMMITTEE

17


MMRIA
MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM v22
CONTRIBUTING FACTORS AND RECOMMENDATIONS FOR ACTION
CONTRIBUTING FACTORS WORKSHEET
RECOMMENDATIONS OF THE COMMITTEE

18

ARKANSAS MATERNAL MORTALITY REVIEW TEAM

- From 2018 to 2019, there were 54 pregnancy-associated deaths in Arkansas, 23 of which were pregnancy-related.
- The most common causes of pregnancy-related deaths were cardiovascular conditions, excessive bleeding, and infection.
- Pregnancy-related deaths disproportionately affected mothers of Black or Asian race, and in those over the age of 30 years.
- Overall, 78% of pregnancy-related deaths occurred during pregnancy or within the first 42 days of the end of pregnancy.
- Furthermore, 91% of pregnancy-related deaths were considered preventable by the maternal mortality review committee.

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ROLE OF FORENSIC PATHOLOGISTS

- Forensic pathologists are in a strong position to ensure that a thorough medicolegal death investigation and autopsy are completed on all maternal and late maternal deaths to best understand the circumstances and causes of deaths.
- The completion of a thorough medicolegal death investigation and autopsy are critical to learn from and prevent future maternal deaths.
- Many medical examiner and coroner offices are active contributors of community and statewide maternal mortality review committees that bring together multiple stakeholders that share the common goal of improving maternal morbidity and mortality.

20

ARKANSAS MATERNAL MORTALITY REVIEW TEAM

- In 2018 and 2019, autopsies were performed in 54% of pregnancy-associated deaths in Arkansas.
- Due to a teamwork approach, April 2023 marked the passing of a new bill in Arkansas legislation, ensuring that pregnant women or women pregnant within one year of her death with a potentially pregnancy-related cause of death, should be referred to the Medical Examiner Section of the Arkansas State Crime Laboratory for a postmortem examination.

(1) The death is of a pregnant female or a female who was pregnant within three hundred sixty-five (365) days of the female's death and the death is potentially related to the care of or physiology of pregnancy or the maintenance of the pregnancy, unless the death resulted from a medical condition or injury not causally related to the pregnancy.

21

Dedication

This report is produced in remembrance of all the women who have lost their lives during and after pregnancy and childbirth from any cause.

It is with deepest sympathy and respect that we dedicate this report to the memory of all Arkansas women who died while pregnant or within one year of pregnancy, and to their loved ones.

We hope collaborative efforts to further understand the causes and contributing factors of maternal mortality will help to create new pathways to prevention, health, and equity for Arkansas women.

22

THANK YOU

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Arkansas State Crime Laboratory
Department of Public Safety

Program Director
Forensic Pathology Fellowship Program
Arkansas State Crime Laboratory and
University of Arkansas for Medical Sciences

23

Management of Unidentified and Indigent Remains in a Death Investigation System:
The Pima County (Tucson), Arizona Experience

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COLLEGE OF MEDICINE TUCSON Pathology

PIMA COUNTY OFFICE OF THE MEDICAL EXAMINER

1

Disclosures

None

2

How are indigent remains usually handled?

- This topic is not frequently discussed, but is a frustration for most death investigation systems
- Ambiguity of who is responsible for handling indigent remains process with records (cemetery, funeral home, which county department, OME, etc.)
- Ambiguity of time frame for finding next of kin
- No publicly available metrics concerning volume, costs, & disposition of remains
- No consistency nationwide

3

How are indigent remains usually handled? Per the National Funeral Directors Association

- Varies widely by city, county, and state
- Counties bear responsibility in at least 34 states
- Attempts at increasing vetting process for indigent burial programs due to increase in indigent populations
- Rising costs paid to funeral homes, crematoriums, cemeteries by counties
- Some counties push for body donation
- Some counties running out of space for burials → cremation
- Programs getting cut altogether due to rising cost
- Some wealthy counties have the means for casket burials/unlimited cemetery space

4

Overlap with Medical Examiner Offices

- Morgue (cold storage) & skeletal remains management

Involvement of other agencies
- County clerk, public fiduciary/other finance department, chaplain, etc.

- Funeral home/death care industry overlap
  - Embalming, burial, cremation, transportation, etc.
- Investigator attempt to identify remains/find next of kin (NOK)
- Dedicated person for family/NOK phone calls after investigator attempts
- Interment locations and practices
  - Cemetery columbaria, burial plots, etc.

5

Defining the "indigent" in a Medical Examiner system

Identified decedents
- Who are abandoned by next of kin (NOK)
  - Fail or refusal to make interment arrangements
- Who are not abandoned by NOK but the decedent and family met poverty standards
  - How this works will vary locally
- No NOK can be found
  - The due diligence process to find NOK is extremely variable

Unidentified decedents
- NOK and financial status unknown

6

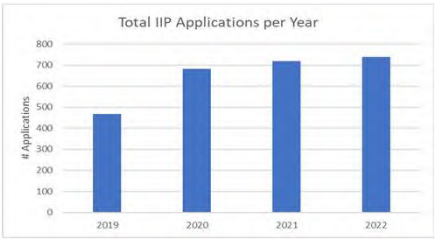
Pima County Office of the Medical Examiner Indigent Interment Program (IIP)

Financial assistance for cremation

- **Under Federal Poverty Level (FPL) and <$1500 in bank**
- ~5% of all deaths in Pima County are referred to the IIP after investigators attempt to locate NOK
- IIP coordinator then tries to locate NOK or finances from the decedent
- ~60% of applications are approved ($600-700 per contracted funeral home prices)
- Paid for by the county; in 2022, 451 cremations were approved, totaling ~$270K

7

IIP applications & approvals steadily increasing



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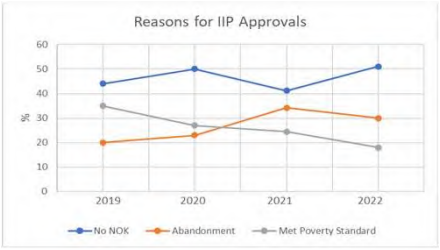
Abandonment increasing, meeting poverty standard decreasing



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Disposition of human remains in the US

Cremation
- Cost: average $6-7K with viewing, visitation, funeral; $1,100 without (direct)
- Frequency: 50-60% of people in the United States, 80% by 2035
- Challenges: Greenhouse gas emissions equivalent to 500 miles in a car

Burial
- Cost: $7-12K with funeral
- Burial plot: $350-5K
- Frequency: 40-50% of people in the United States
- Challenges: Cemetery pollution- heavy metal & toxic organic pollutants in soil, water, and sometimes air; Space; Leasing burial plots

Other "green"
- Acquamation, soil transformation, natural burial, body donation, tissue industry, other eco-friendly burials, etc.

10

Indigent Cremation in Pima County Cemetery

Columbaria: a structure (room, building, wall) used to store cremains

- 4 columbaria, each has 660 cremation urn locations (2,640 total capacity)
- Currently there are 2,040 cremains being stored; 600 locations available
- Remains location administration tracks when more columbaria need to be built
- Exhumation is $10

11

Columbaria for Cremations Steadily Decreasing

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Indigent Burial in Pima County Cemetery

- There are currently 106 burial plots remaining
- We are no longer burying indigent or unidentified remains
- Exhumation can cost $1-3K

Credit: KGUN9 News

13

History of unidentified remains management in Pima County

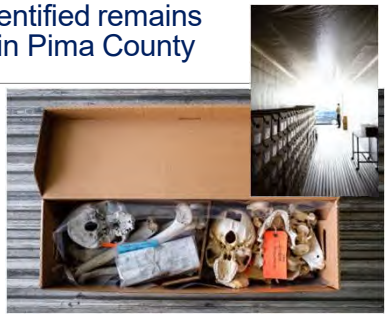
- Prior to 2005: remains were buried
- 2005-2018: remains were cremated
- Problems with cremating unidentified people:
  - Can't look at the remains again from Forensic Anthropology POV
  - Families seem to prefer skeletal remains as opposed to cremains
  - Costs more $ than retaining skeletal remains

Credit: Arizona Daily Star

14

History of unidentified remains management in Pima County

- 2018-present: remains are stored as skeletal remains in "Bone Box Trailer"
- Pima County has more unidentified remains than many counties due to migrant remains found in desert
- Since 2002, 66% of the 3600 UBC remains have been identified



Credit: Roberto (Bear) Guerra via The Guardian

15

Migrant deaths

16

Pima county disposition statistics of unidentified remains

- Skeletal remains in long-term storage: 577
- Total cremains in columbaria pod: 745
- Total unidentified burials at cemetery: 156

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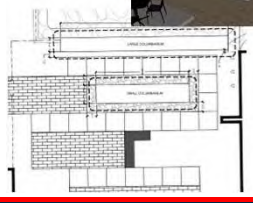
Future plans for the PCOME

- New $45 million, 37K sq ft facility
- For cremation:
  - New retorts run by the PCOME (not by a local funeral home vendor) for human remains and PACC remains
  - Separate locations of unidentified cremains and identified cremains
  - Columbaria at facility to hold up to 1,540 adult-sized urns



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Future plans for the PCOME

For storage of skeletal remains:
- Indoor long-term storage room
- Won't need outdoor semi-trailer

- Capacity for long-term skeletal storage: ~2500

19

The IIP is only one example of handling indigent remains

- May not be the right way for every place
- Different offices have unique decedent populations mixed with local challenges (OME vs coroner, storage availability, funding, forensic anthropology, indigent programs, other resources, etc.)
- Lack of discussion or information on how this universal function is handled in hundreds of different places
- Compiling this info in the future may help with creating consistency nationwide

20

Thank You
Dr. Hess, Lorenia,
Dr. Winston,
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Office of the
Medical Examiner

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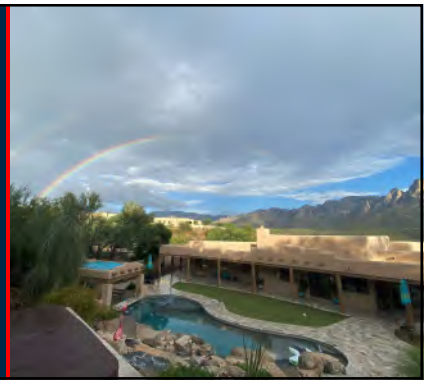


21

When Vaping Isn't Actually Safer

Timothy Ogburn, BS, University of Nevada-Reno School of Medicine, Reno, NV
Irfan Chaudhry, MD, Assistant Medical Examiner, Washoe County Regional Medical Examiner's Office and Assistant Professor, University of Nevada-Reno School of Medicine, Dept of Pathology
Laura D. Knight, MD, Chief Medical Examiner & Coroner, Washoe County Regional Medical Examiner's Office and Associate Professor, University of Nevada-Reno School of Medicine, Depts of Pathology and Pediatrics

1

Case Report – Antemortem

- A 43-year-old female complained to family that she was not feeling well. Later when family arrived, she was reported to be unable to stand and then became unresponsive.
- Ambulance was called and was found to have decerebrate posturing. She was then transported to the emergency room where she presented with fixed and dilated pupils; and hypotensive with cold, mottled skin.
- She then had cardiac arrest and was intubated & resuscitated and later admitted to the hospital.

2

Case Report – Antemortem

- *Clinical Laboratory Values*
  - Anion gap metabolic acidosis
  - Lactate 11.8 mmol/L
  - sOsm 423 mOmsol/kg
  - Undetectable salicylates and EtOH
  - Wood's lamp → ethylene glycol
- Patient treated with fomepizole
- *Hospital Course*
  - Altered mental status
  - Shock
  - Renal failure
  - Continued declining condition
  - Expiration 1 day post comfort care
- *Clinical Serum Toxicology*
  - Undetectable ethylene glycol
  - 235 mg/dL of methanol

3

Case Report - Autopsy

- *Head & Central Nervous System*
  - Cerebral edema
  - Uncal notching
  - Cerebellar tonsillar herniation and infarction (Fig. A)

Fig. A

4

Case Report - Autopsy

- *Renal Microscopy*
  - H&E – renal tubular epithelium cytoplasmic vacuolization (Fig. B)
  - Myoglobin IHC – intracytoplasmic granules (Fig. C)
  - Lack of birefringent crystals

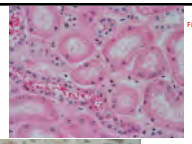


Fig. B

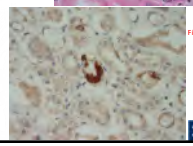


Fig. C

5

Case Report – Postmortem Toxicology

- (+) Benzodiazepines & etomidate
- (+) Caffeine
- Δ-9 THC 6.3 ng/mL
- Propylene glycol 59 mg/dL
- Methanol 220 mg/dL
- *No detection of ethylene glycol*

- Toxicology testing performed on blood specimens obtained from decedent's hospital admission

6

Case Report – Cause of Death

- Cause of death attributed to methanol and PG poisoning, and the manner of death was accidental
- Methanol and PG are solvents in household and automotive products
  - Methanol metabolized into formic acid via alcohol dehydrogenase
  - Treatment includes hemodialysis, folate, or fomepizole*

Fig. 1

*Ethylene glycol toxicity is also managed with fomepizole

7

Case Report – Pertinent Past Medical History

- *Decedent Past Medical History*
  - Chronic pain secondary to endometriosis
  - Family reported decedent created vape tinctures with THC oils and other glycol solvents for pain relief


Fig. 2

8

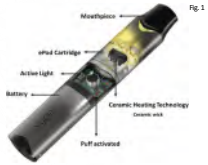
Case Report – Discussion

- As of January 2020, 2600 hospitalizations/deaths associated with e-cigarette inhalation[1]
- Smaller subset of injuries secondary to ingestion with toxicity associated to nicotine overdose[2-6]
- We report a unique case of oral ingestion with cause of death attributed primarily to vape juice contamination

9

Electronic Cigarettes (Vapes) – How They Work

- User presses button to activate heating element
- Heating element "vaporizes" liquid in cartridge
- Vapor is inhaled through mouthpiece



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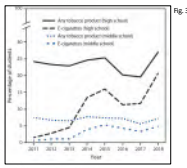
Vape Juice Composition & EVALI

- Vaping liquids previously contained[7]:
  - Psychoactive agent (nicotine/THC)
  - Flavoring agents
  - **Vitamin E acetate**
  - Solvents (PG, EG, VG)
- E-cigarette, or vaping product, associated lung injury (EVALI)[8]
  - Respiratory inflammation
  - ARDS

11

The Trend and Concerns of E-Cigarette Usage

- Vapes introduced into market as a cigarette alternative in 2007[9]
- Usage skyrocketed in youth by 2015 (Fig. 3)
- 2600 hospitalizations/deaths associated with EVALI as of Jan 2020[10]



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Electronic Nicotine Delivery Systems (ENDS): Federal Regulations

- **2016**
  - FDA limits manufacturing, distribution, and advertising of ENDS[11]
- **2020**
  - FDA prohibits the sale of "closed pod" cartridges[12]


Fig. 4


Fig. 5

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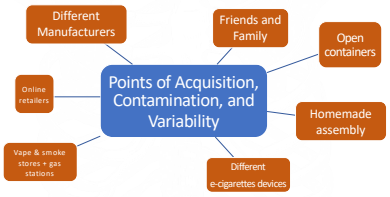
ENDS: Content Contamination



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Case Report – In Conclusion

- ENDS vaping liquids are loosely regulated
- Many points of entry for potential liquid contamination
- Vaping trends will likely continue for years to come
- Hospitalizations and deaths related to vaping or vaping products may also continue

15

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REGIONAL MEDICAL EXAMINER'S OFFICE

School of Medicine

16

Proper Classification of Child and Youth Suicides: Is there a threshold of too young?

Kathryn Pinneri, MD; Marcus Nashelsky, MD; Margaret Warner, PhD

1

Disclosure

No financial interests or conflicts of interest to disclose

2

National Institute of Mental Health (NIMH)

- Virtual workshop, April 2023
- Research, Practice and Data Informed Investigations of Child and Youth Suicide: A Science to Service and Service to Science Approach
  - Focused on the escalating crisis of child and youth suicide to stimulate a collaborative response toward understanding and ultimately preventing this tragic problem
  - Forensic pathologists, epidemiologists, death investigators, pediatric psychiatrists, adolescent psychologists and researchers
  - NIMH » Research, Practice, and Data Informed Investigations of Child and Youth Suicide: A Science to Service and Service to Science Approach (nih.gov)

3

Suicide and Crisis Lifeline

- 988
  - 24 hours/day; English and Spanish
  - Free, confidential support for people in distress
  - Call or text
  - National network of over 200 local crisis centers
  - Over 20 million calls
    - 2.5 million in 2021
    - 825 thousand in 2011

4

Crisis Text Line

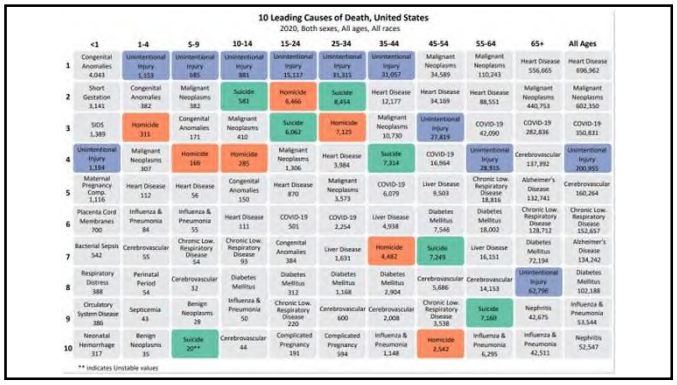
- Text HOME to 741741
  - Anywhere in the US
- Crisis counselor will respond
- Secure online platform: crisistextline.org
  - Text, chat, WhatsApp

5

General Suicide Statistics

- 2021:
  - 48,183 deaths
  - Estimated 1.7 million suicide attempts
- Estimated 49,449 deaths in 2022 (2.6% increase)

6



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Youth Suicide Data, 2020

- Fatal self-inflicted injuries
  - 10-14 year olds: 2nd leading cause of death
  - 15-19 year olds: 3rd leading cause of death
  - Holds true for 2021, overall numbers increased
- Information for children less than 10 is not included in routine statistical reports
  - Due to inaccurate manner of death classification and misperceptions that young children don't understand the concept of death or have suicidal thoughts
  - Small numbers (thankfully)

5-9	10-14	15-24
Unintentional Injury 685	Unintentional Injury 881	Unintentional Injury 15,117
Malignant Neoplasms 382	Suicide 581	Homicide 6,466
Congenital Anomalies 171	Malignant Neoplasms 410	Suicide 6,062
Homicide 169	Homicide 285	Malignant Neoplasms 1,306
Heart Disease 56	Congenital Anomalies 150	Heart Disease 870
Influenza & Pneumonia 55	Heart Disease 111	COVID-19 501
Chronic Low. Respiratory Disease 54	Chronic Low. Respiratory Disease 93	Congenital Anomalies 384
Cerebrovascular 32	Diabetes Mellitus	Diabetes Mellitus 312
Benign Neoplasms 28	Influenza & Pneumonia 50	Chronic Low. Respiratory Disease 220
Suicide 20**	Cerebrovascular 44	Complicated Pregnancy 191

8

Leading causes of death among 5-24 year olds, 2021

Rank	Age 5-9	10-14	15-19	20-24
1	Unintentional Injury 827	Unintentional Injury 915	Unintentional Injury 5,084	Unintentional Injury 10,708
2	Malignant Neoplasm 347	Suicide 598	Homicide 2,758	Homicide 4,185
3	Homicide 188	Malignant Neoplasm 449	Suicide 2,343	Suicide 3,877
4	Congenital Anomaly 177	Homicide 298	Malignant Neoplasm 592	COVID-19 1,050
5	Heart Disease 66	Congenital Anomaly 179	COVID-19 351	Malignant Neoplasm 731

Source: CDC/NCHS, National Vital Statistics System, Mortality File

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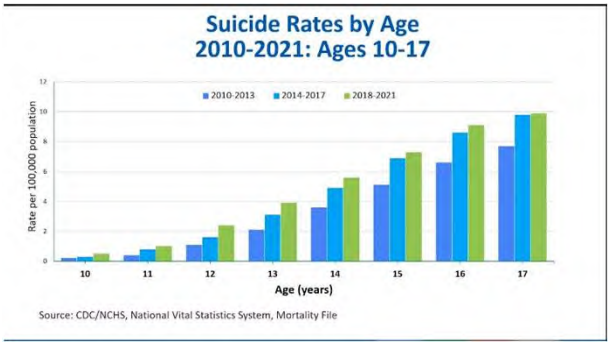
Suicide Rates by Age
2010-2021: Ages 10-17
2010-2013
2014-2017
2018-2021
Rate per 100,000 population
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16
17
Age (years)
Source: CDC/NCHS, National Vital Statistics System, Mortality File

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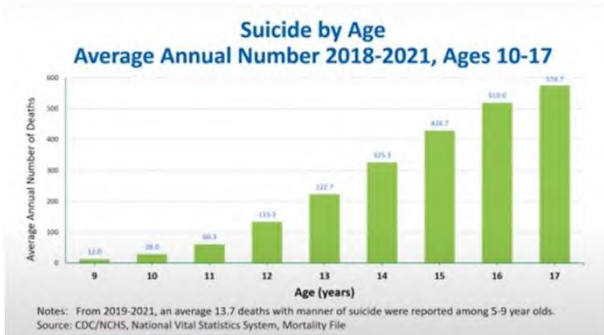
Suicide by Age
Average Annual Number 2018-2021, Ages 10-17
Average Annual Number of Deaths
9
10
11
12
13
14
15
16
17
Age (years)
Notes: From 2019-2021, an average 13.7 deaths with manner of suicide were reported among 5-9 year olds.
Source: CDC/NCHS, National Vital Statistics System, Mortality File

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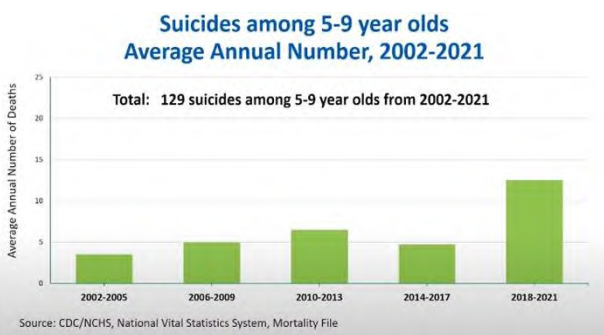
Suicides among 5-9 year olds
Average Annual Number, 2002-2021
Total: 129 suicides among 5-9 year olds from 2002-2021
Average Annual Number of Deaths
2002-2005
2006-2009
2010-2013
2014-2017
2018-2021
Source: CDC/NCHS, National Vital Statistics System, Mortality File

12

Suicides in 5-9 year olds

- 2001 – 2021
  - 136 suicides
  - 78% were male
  - 88% by asphyxia means; predominantly hanging
  - Race:
    - White, non-Hispanic, 0.02 per 100,000 (crude rate)
    - Black, non-Hispanic, 0.08 per 100,000 (crude rate)
    - Hispanic, 0.02 per 100,000 (crude rate)

Source: CDC/NCHS; National Vital Statistics System, Mortality File

13

Suicide Statistics

- Suicide rates increased ~ 57% from 2007 – 2018 in the 10-24 year age group
- Rates in females age 10-14 years tripled from 1999 – 2014
- Rates increasing at a faster rate in black children and adolescents
- ED presentations for self-harm behavior
  - 181 percent increase from 2001 – 2020
- 2019: 5485 ED visits for suicidal ideations/self-harm among 6 to 12 year olds
  - 115% overall increase since 2016 (2555)

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Suicide Statistics

- 2021: 42% increase in ED visits for self-injury and suicidal ideations/attempts in children ages 5-18 years over 2019
- More than half of children who make a suicide attempt or die by suicide have had a visit to a physical health provider in the 6 months prior to the attempt (Children's Hospital Association website, 2022)
  - Need to learn how to recognize the signs/symptoms/behaviors associated with childhood depression
  - Missing the opportunity for intervention

15

Depression

- DSM-5 Criteria: Five or more symptoms during the same 2-week period with at least one of the symptoms being depressed mood or loss of interest or pleasure
  - Significant weight loss or change in appetite nearly every day
  - Slowing down of thought and decreased physical movement
  - Fatigue or loss of energy nearly every day
  - Feelings of worthlessness, excessive or inappropriate guilt nearly every day
  - Diminished ability to think or concentrate nearly every day
  - Recurrent thoughts of death, recurrent suicidal ideation or a suicide attempt
- Symptoms must cause significant distress or impairment in social, occupational or other important areas of functioning for a diagnosis of depression

16

Childhood Depression

- Criteria in DSM-5 aren't as applicable in preschool and elementary aged children
  - 2002: Luby, et al established age-specific criteria for preschool-onset major depressive disorder; however they were not included
- Clinical depression can arise as early as age 3
  - Symptoms are developmentally specific
  - Some of the same biological markers and neural alterations as adults

17

Childhood Depression

- Most kids internalize symptoms; not really disruptive
  - Anhedonia: "nothing is fun"
  - Excessive guilt: "it's all my fault"
  - Kids don't' like them or won't play with them
  - They think they are 'bad' and think "I wish I was never born"
  - Kids, including preschoolers, now saying: "I want to kill myself"

18

Suicidality in Preschool Aged Children

- Sample of 230 depressed preschoolers – engaged in a randomized clinical trial of psychotherapy for depression (Luby, et al 2009)
- Really high rates of suicidal expressions (~50%)
  - Passive: I wish I was dead
  - Expressive: I want to kill myself
  - Demonstrative: wrapping things around their neck, jumping from a height, running into the street
- Children who expressed suicidality depicted more violence and more suicide in their conflict resolutions (using story stems: conflict laden story and they have to complete it)

19

Understanding Death

- By age 4: can distinguish between things that die and don't die
- By age 5 or 6: understand that death is a permanent, irreversible state
- Depressed 4 to 6 year old children with suicidal ideations and behaviors have a more mature understanding of death than depressed peers without suicidal ideations or non-depressed/healthy peers (Hennefield, et al 2019)
  - It is irreversible
  - It is universal (living things die)
  - Causality (things cause death)

20

Suicidality Risk

- Preschool onset depression is a robust predictor of having suicidality in the pre-adolescent period
  - 7x greater odds of having any kind of suicidal thoughts and behavior in pre-adolescence if depressed as a preschooler

21

Parental Perceptions

- Discordance between what parents report and what children report
- Parents aren't aware of all the symptoms the child is having
  - Internalizing behaviors
  - Limited time with children (increased use of electronic devices; parents working; kids at school/daycare)

22

Questions to Ask

- Has your child:
  - Lost interest in things they used to enjoy
  - Been more withdrawn
  - Made comments about their peers not liking them or not wanting to play with them
  - Made comments about being 'bad', wishing they weren't born or thinking 'everything is their fault'
- Answers may reveal the subtle signs of childhood depression

23

Risk Factors for Younger Children

- Impulsivity
- Cognitive skills (inability to imagine the future vs the hear and now; can't see past the experience going on)
- Emotional immaturity
- Lack of coping skills
- Triggering event: i.e., argument with family or friends
- History of physical or sexual abuse

24

Obtaining the Information

- What is asked and how it is asked may affect the answer provided
- Who is giving the information
  - Parents
  - Siblings (less likely to be able to ask them questions, depending on age)
  - Close contacts: teachers, peers, other family members

25

Suicide Survivors

- 1 in 5 youth are exposed to the loss of a peer to suicide
  - Exposure to a schoolmates' suicide increases the risk of suicidal ideations and attempts for over 2 years in ages 12 to 15
- Thoughts that if you talk to a child about suicide, you are putting that thought into their mind
  - No evidence to support this in younger population
- Risk of a future attempt not attenuated by the closeness of someone to the person who died
  - Importance of universal prevention strategies to support youth when there has been a suicide loss

26

Suicide Survivors

- Parental loss of a child to suicide is a risk factor for suicide, depression, anxiety and divorce
  - Especially if in early childhood
  - Much higher in first month in both males/females, but higher for the first year in females
- Ripple effect: For every person who died by suicide, 135 people exposed (J Cerel et al, 2019)
  - 48,000 people who died by suicide in 2021: 6.1 million people exposed to a suicide loss

27

Postvention

- Very specific context where we might be able to help people at increased risk for suicide
- Postvention window: first year for both parents; longer for siblings/relatives
- Goals:
  - Prevent further suicides
  - Support the bereaved
  - Counteract other negative effects of exposure to suicide (social stigma)

28

Is There a Threshold of Too Young?

- NO:
  - Children as young as 4 have suicidal thoughts and behaviors along with a more mature understanding of death
  - No age limit for homicide classification
  - Exposure to violent content occurring at younger and younger ages
- Case Dependent
  - Kids are impulsive; permanent solution to a temporary problem
  - Try to get an understanding of the childs mental health for correct classification based on the case circumstances, not age
- Age cut-offs eliminate the presence of a problem

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Summary

- Childhood depression is seen in children as young as 3 years of age
- Preschool depression with suicidal thoughts and behaviors is a strong predictor of adolescent suicidal ideations
- Depressed preschool children with suicidal ideations have a better understanding of death than originally thought
- Stop using set age limits for pediatric suicides; classify the manner objectively, just like you would an adult
- Include all ages in data collection
- Proper certification guides intervention, prevention and postvention efforts

30

Causes of Death in Therapeutic Complication Fatalities in Connecticut

Donald Turbiville, M.D.; Maura DeJoseph, D.O.; James R. Gill, M.D.

Connecticut Office of the Chief Medical Examiner

1

"Medicine-Related" Deaths

- **THERAPEUTIC COMPLICATION: Predictable complication of appropriate treatment.**
- **ACCIDENT: Complication that should not occur (inadvertent).**
- **NATURAL: 100% due to disease or old age. The "But for test": Regardless of the operation/procedure, would the patient likely have died?**
- **HOMICIDE by Doctor: Intent to kill or gross and wanton disregard for the safety of the patient ("extreme medical negligence")**

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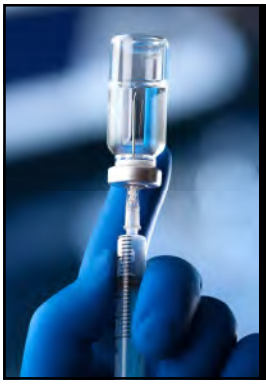

Therapeutic Complications

- Adverse events following elective procedures such as:
  - Postoperative bleeding
  - Infections
  - Pulmonary thromboembolism
- Adverse effects of medication, such as:
  - Anaphylaxis to medication in a patient with no known history
  - Bleeding following anticoagulation administration
- Transfusion reactions
- Adverse reactions to anesthesia
- Complications of hemodialysis

3

Therapeutic Complication: *Cause of Death Statement: 3 Components*

- Complication
- Procedure/Treatment
- Disease

- Example:
- Hemoperitoneum
- Due to liver biopsy for
- Primary Biliary Cirrhosis

4

Accident

- Sepsis and Peritonitis
- Due to inadvertent infusion of gastric feeding liquid (Jevity) into peritoneal dialysis catheter placed for diabetic kidney failure.

5

55 YO Woman with elective liposuction

- She had liposuction procedure on Monday
- Wednesday, she went back to plastic surgeon
- She was hypoxic, mottled skin (911 was called)
- ED: Lactic acidosis; Creatinine 4.6; Rhabdomyloisis >7000
- Blood pressure dropped, bradycardia, cardiac arrest
- Autopsy on Friday

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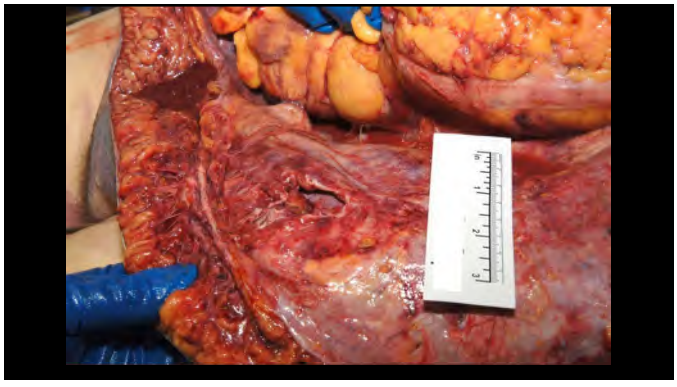

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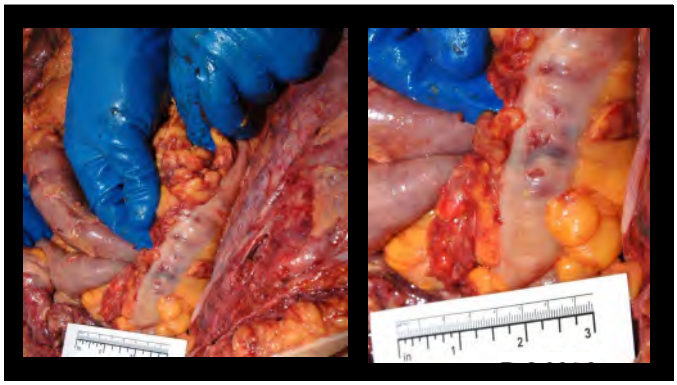

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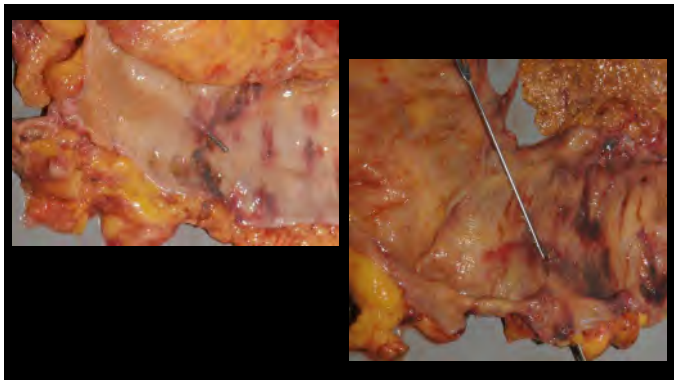

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Sepsis with Peritonitis due to Perforation of Large Bowel Complicating Abdominal Cosmetic Liposuction

Accident

13

Medical Homicide

- Intentional act to cause death
- Extreme Medical Negligence
  - -Gross and wanton disregard for the safety of the patient

14

43 yr old Hispanic woman
History of smoking and high cholesterol

- ED: SOB, CP, Palpitations, Fever
  MI ruled out
  Chest x-ray: lower lobe atelectasis
  Diagnosis: Pneumonia, r/o PE
  Oxygen sat improved with face mask
  Heparin drip
- Found unresponsive in bed
- Nurse's Aide: recent "botox" injections in buttocks

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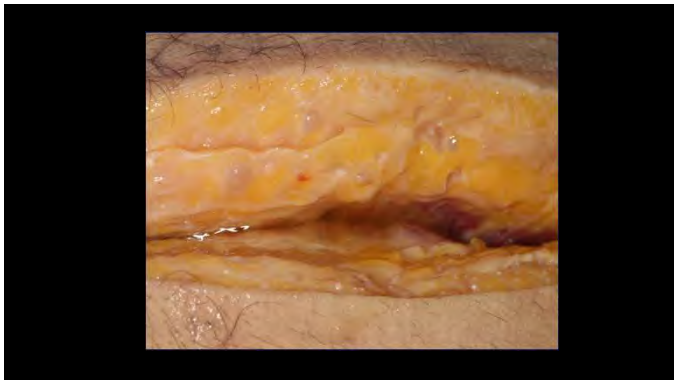

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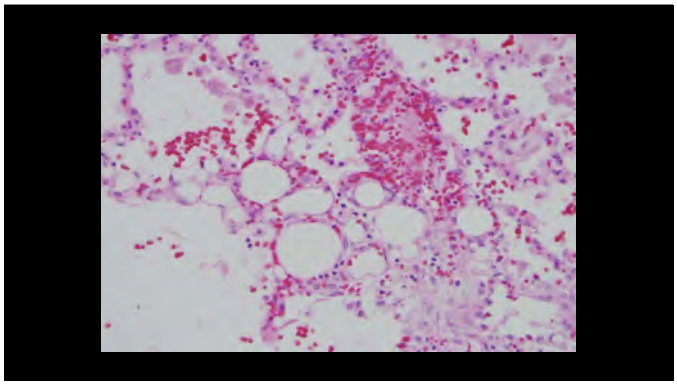

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Massive Systemic Silicone Embolism

A Case Report and Review of Literature

Eroston A. Price, MD, Harold Schueler, PhD, and Joshua A. Perper, MD

Abstract: Subcutaneous injections of inert or quasi-inert plastic material designed to smooth out wrinkled skin or to create a more esthetically sought appearance have become very popular with the American public in general, and, in particular, with certain groups highly focused on their physical image. The ease of the injection procedure has attracted into the field of plastic medicine a substantial number of illegal, incompetent, and unscrupulous operators. Their ignorance of involved medical risks and procedures not uncommonly results in severe complications, disfigurement, and death of patients. We report the typical pathological and chemical findings of a systemic fatal silicone embolism in a 53-year-old heterosexual woman following illegal chronic injections of silicone in her hips and buttocks. The injected subcutaneous silicone apparently migrated rapidly from the interstitial subcutaneous tissue into the general blood stream resulting in a fatal systemic silicone embolism. An analysis of the presented case in conjunction with a review of the pertinent medical literature, including a recent article, revealed a marked similarity in the clinicopathologic findings between silicone embolism and fat embolism.

Key Words: silicone, pulmonary embolism, subcutaneous injections.

(*Am J Forensic Med Pathol* 2006;27: 97–102)

21

CAUSE OF DEATH:	SILICONE PULMONARY EMBOLISM DUE TO COSMETIC SILICONE INJECTIONS OF BUTTOCKS AND THIGHS.
MANNER OF DEATH:	HOMICIDE
HOW INJURY OCCURRED:	SILICONE INJECTIONS BY NON-MEDICAL, UNLICENSED PERSON.

22

Natural vs.Therapeutic Complications (TCs)

- In general, complications that occur during emergency surgeries/procedures for natural disease, are certified as natural.
- TCs that occur during treatment of a potentially life-threatening injury are superseded by the manner dictated by the circumstances of the initiating injury.
- The TC certification usually does not address errors of omission, clinical judgment/management, or missed diagnoses.

23

November 1999

INSTITUTE OF MEDICINE

Shaping the Future for Health

TO ERR IS HUMAN:
BUILDING A SAFER HEALTH SYSTEM

Health care in the United States is not as safe as it should be--and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies. Even using the lower estimate, preventable medical errors in hospitals exceed attributable deaths to such feared threats as motor-vehicle wrecks, breast cancer, and AIDS.

Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. Among the problems that commonly occur during the course of providing health care are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities. High error rates with serious consequences are most likely to occur in intensive care units, operating rooms, and emergency departments.

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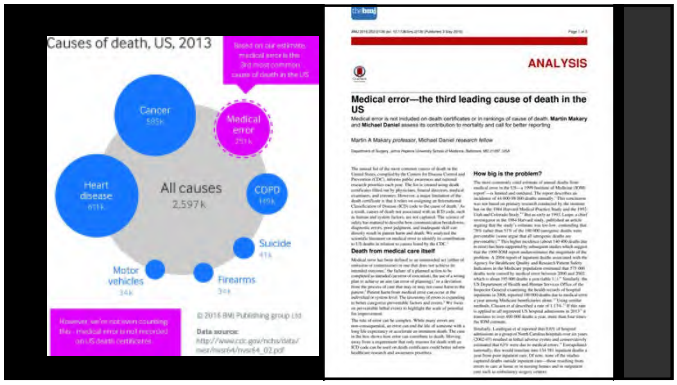

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Background

- Definitions and estimates of medical error vary
- Regardless, medical complications and errors have been widely recognized as an important cause of harm to patients, and there has been considerable attention focused on recognition and prevention in recent years
- For death certification in Connecticut, inadvertent medical errors are classified as accidents
- The therapeutic complication manner allows for ease of tracking of deaths related to medical therapy for vital statistics (can search by manner).
- Connecticut OCME started using therapeutic complication in 2014

26

Methods

- Deaths due to medical complications are reportable to the Connecticut OCME and undergo investigation with death certification and in some cases, autopsy examination
- All fatalities certified as a therapeutic complication between July 2014 and December 2022 were reviewed
- A total of 1038 therapeutic complications were certified, and investigations included:
  - Investigator death certificates only: 806 (78%)
  - Full autopsy: 216 (21%)
  - External examination: 15 (1%)
  - Limited autopsy: 1 (<1%)
- Death certificates and medicolegal death investigator reports were reviewed and cases were categorized by cause and location of death
- Excluded were 24 deaths that occurred due to complications of two or more types or therapy or surgeries
- Deaths were classified as operative (related to a surgery) or non-operative (related to a non-surgical procedure or other medical therapy)

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TABLE 1—*Categories of therapeutic complications.*

Complication	Example
Operative:	
Postoperative infection	Bronchopneumonia, wound infection, line sepsis, urinary tract infection
Technical	Dehiscence, bleeding
Nontechnical	Ileus, cardiac arrhythmias
Late/delayed	Adhesion, splenectomy associated infection
Anesthesia related	Hyperthermia, ventilation problems, anesthesia reactions
Pulmonary embolism	Postoperative
Transfusion	Complication of transfusion that was needed due to surgery
Nonoperative:	
Nonoperative infection	Line sepsis, urinary tract infections
Procedure: technical	Gastric tubes (leaks/bleeding), bleeding with cardiac catheterization, bronchoscopy, or invasive radiologic procedures, perforation during colonoscopy
Procedure: Nontechnical	Arrhythmia during stress test or catheterization
Medication	Anaphylaxis, infection during steroid therapy, toxic epidermal necrolysis, gastrointestinal hemorrhage (nonsteroidal anti-inflammatory medication), and pseudomembranous colitis (following antibiotic therapy)
Anticoagulation	Bleeding complications with anticoagulation therapy
Hemodialysis	Bleeding, shunt problems, electrolyte disturbances, subdural hemorrhages, infected shunt
Pulmonary embolism	Nonsurgical inactivity, medications
Radiation therapy	Fibrosis/infection
Transfusion	Transfusion reactions, viral hepatitis, or HIV infection

Gill JR, Goldfeder LB, Hirsch CS. Use of "therapeutic complication" as a manner of death. J Forensic Sci. 2006 Sep;51(5):1127-33.

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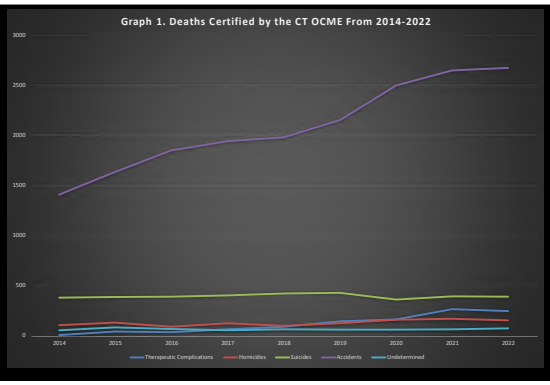

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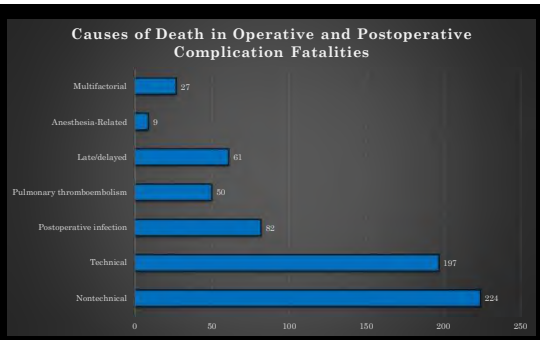

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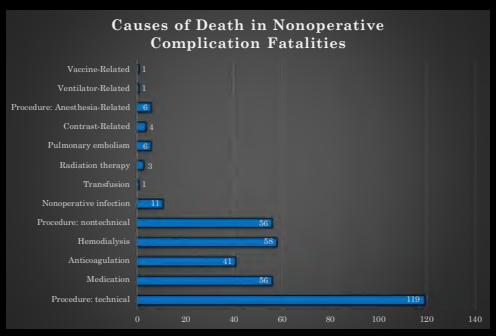

Total Number of Cases: 363 (35% of Therapeutic Complications)

31

Surgeries Associated with Therapeutic Complication Deaths

Type of Surgery	Number of Fatalities (%)
Cardiothoracic surgery	163 (25%)
General surgery	144 (22%)
Vascular surgery*	87 (13%)
Orthopedic surgery (non-spinal)*	76 (12%)
Orthopedic surgery (spinal)	49 (8%)
Urologic surgery	27 (4%)
Transplant surgery	22 (3%)
Obesity surgery	18 (3%)
Oncologic surgery	16 (2%)
Neurosurgery	16 (2%)
Obstetric-Gynecologic surgery	13 (2%)
Head and Neck surgery	11 (2%)
Podiatric surgery	3 (<1%)
Plastic surgery	2 (<1%)
Pediatric surgery	1 (<1%)
Total	**648**

*One fatality was associated with both orthopedic and vascular surgeries

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Procedures Associated with Multiple Fatalities

- Cardiac catheterization/percutaneous coronary intervention: 35
- Needle Biopsies: 25
  - Liver: 13
  - Lung: 7
  - Kidney: 3
  - Endometrium: 1
  - Lymph node: 1
- Endoscopy and/or Colonoscopy: 22
- PEG tube placement: 13
- ERCP: 8
- Diagnostic Angiogram: 7
- Thoracentesis: 6
- Paracentesis: 5
- Cardiac ablation procedures: 5
- Urinary catheter insertion/removal: 4
- Cystoscopy: 4
- Dental extractions/implants: 4

33

Results: Technical Complications

- Operative:
  - Intra-and-post-operative hemorrhage: 129 cases (66%)
    - 35 cases had an identified source of bleeding
    - Associated with: Vascular surgery (26 cases), aortic aneurysm repair (7), cardiac valve surgery (20), CABG (12), bowel surgery (9), Nephrectomy (7), Whipple (4), Liver transplant (4), Brain surgery (6), hernia repair (3)
  - Perforations of internal viscera: 30 cases
  - Aortic dissection during cardiothoracic surgery: 6 cases
  - Pneumothorax: 3 cases
  - Anastomotic site dehiscence: 7 cases
  - Device failure, ventriculoperitoneal shunt malfunction, annular rupture

34

Results: Technical Complications

- Nonoperative:
  - Procedural technical complications:
    - Procedural hemorrhage: 60 cases (50%)
      - Associated with: needle biopsies (20), cardiac catheterization/PCI (12), PEG tube placement (5), paracentesis (4), thoracentesis (4)
    - Perforations: 20 cases
    - Coronary artery injury during catheterization: 10 cases
    - Malpositioned PEG/j/cholecystostomy tubes: 7 cases
    - Pneumothorax: 3 cases

35

Results: Nontechnical Complications

- Operative:
  - Cardiac arrhythmias: 120 cases (54%)
  - Documented myocardial infarct: 11 cases
  - Respiratory compromise: 19 cases
  - Stroke and intracerebral hemorrhage: 13 cases
  - Vascular thromboses: 9 cases
  - Small bowel obstruction: 5 cases
  - Ileus: 4 cases

36

Results: Nontechnical Complications

- Nonoperative:
  - Procedural nontechnical:
    - Cardiac arrhythmias: 30 cases (52%)
    - Pancreatitis complicating ERCP: 3 cases
    - Pericardial effusions: 3 cases
    - Other examples: Coaguloapathy (DIC), anaphylaxis during cardiac catheterization, aspiration, fistula formation

37

Results

- Late/Delayed:
  - Small bowel obstruction: 15 cases
  - Infections: 8 cases
  - Hernias from remote abdominal surgeries: 7 cases
  - Transplant rejection and GVHD: 6 cases
  - Other examples: tracheomalacia, short gut syndrome, fistula formation, panhypopituitarism following resection

38

Results

- Medications:
  - C. difficile colitis: 7 cases
  - Digoxin toxicity: 5 cases
  - Lithium toxicity: 4 cases
  - NSAIDS and GI hemorrhage: 3 cases
  - Acetaminophen and liver toxicity: 3 cases
  - Methotrexate toxicity: 2 cases
  - Amiodarone-related lung toxicity: 2 cases
  - Steven-Johnson syndrome and DRESS syndromes: 2 cases each

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Complication	CT data Total	%	NYC Data Total	%
Operative				
Nontechnical	224	34	291	22
Technical	197	30	472	36
Postoperative infection	82	13	183	14
Pulmonary embolism	50	8	132	10
Late/delayed	61	9	175	14
Anesthesia-Related	9	1	47	1
Multifactorial	27	4	0	0
Total	**650**	**100**	**1300**	**100**
Nonoperative				
Procedure: technical	119	33	295	25
Medication	56	15	382	33
Anticoagulation	41	11	171	15
Hemodialysis	58	16	136	12
Procedure: nontechnical	56	15	64	5
Nonoperative infection	11	3	59	5
Transfusion	1	<1	20	2
Radiation therapy	3	<1	15	1
Pulmonary embolism	6	2	29	2
Contrast-Related	4	1	0	0
Procedure: Anesthesia-Related	6	2	0	0
Ventilator-Related	1	<1	0	0
Vaccine-Related	1	<1	0	0
Total	**363**	**100**	**1,171**	**100**

Comparison of Therapeutic Complication Fatalities in Connecticut and New York City

Data adapted from Gill JR, Ely SF, Toriello A, Hirsch CS. Adverse medical complications: an under-reported contributory cause of death in New York City. Public Health. 2014 Apr;128(4):325-31.

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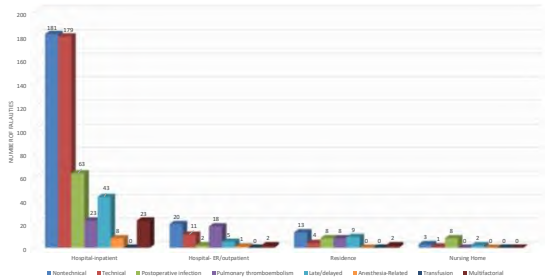

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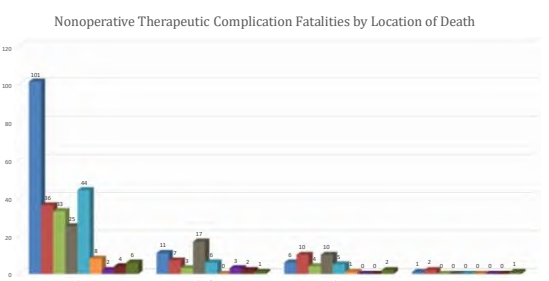

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Results

- Nursing home deaths due to postoperative infection:
  - Hip replacement – 2 cases (pneumonia, septic prosthesis)
  - Knee arthroplasty – 1 case (septic arthritis)
  - Leg amputation- 1 case (pneumonia and surgical site gangrene)
  - TAVR – 2 cases (surgical site infection, endocarditis)
  - Cholecystectomy- 1 case (infected bile duct stent)
  - Proctosigmoidectomy – 1 case (nonhealing wound)

43

Results

- Pulmonary thromboemboli in outpatient and ED settings:
  - Tendon surgery- 3 cases
  - Liposuction/Lipoplasty – 3 cases
  - Spinal fusion – 2 cases
  - Metatarsal pinning
  - Anterior cruciate ligament reconstruction
  - Cesarian-section
  - Hip arthroplasty
  - Knee arthroplasty
  - Prostatectomy
  - Lymphedema surgery
  - Abdominal tumor resection with splenectomy
  - Hernia repair
  - Kidney transplant

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Conclusions

- The therapeutic complication manner of death allows for:
  - Ease of tracking of deaths due to medical complications
  - Retrospective review
  - Evaluation of patterns and trends
- Compared to previously published data from NYC:
  - Fewer technical complication fatalities and more nontechnical in CT
  - Half as many deaths due to medications in CT
- There are higher proportions of deaths due to pulmonary thromboemboli in the outpatient setting and deaths due to postoperative infections in nursing homes
  - Opportunities of improvement for:
    - venous thromboembolism prophylaxis
    - symptom-based discharge instructions
    - close surgical follow-up

45

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46

INNOVATIVE COUNTYWIDE COLLABORATION TO ADDRESS THE OPIOID EPIDEMIC – EXPERIENCES IN VENTURA COUNTY, CALIFORNIA

Othon J. Mena, M.D.
Assistant Chief ME
October 14, 2023

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→ This presentation is without any known conflict of interest

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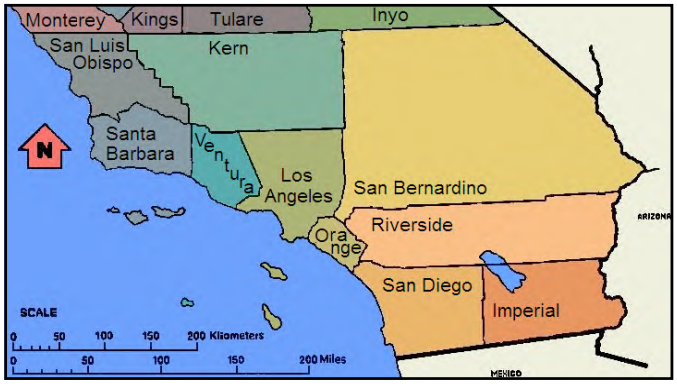

3

Jurisdiction of Ventura County Medical Examiner's Office

12th largest population in CA

~850,000 people
(LA ~ 10 million)

2,200 square miles
(LA & SD ~ 4,000)

3 Pathologists, 7 Investigators

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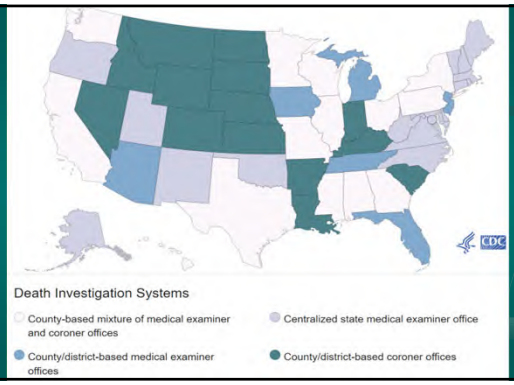

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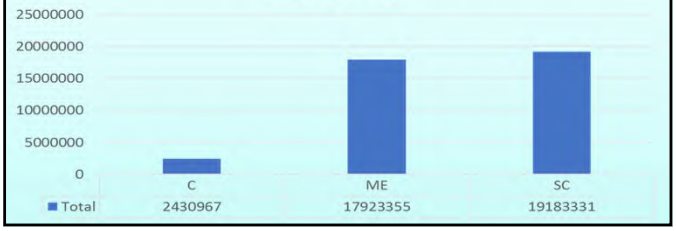
CALIFORNIA:

- 47 Sheriff-Coroners
- 5 Coroners
  - Calaveras
  - Humboldt
  - Inyo
  - Sacramento
  - San Mateo
- 6 Medical Examiners
  - Los Angeles
  - San Diego
  - San Francisco
  - San Joaquin
  - Santa Clara
  - Ventura

6

California Population by Death Investigation System



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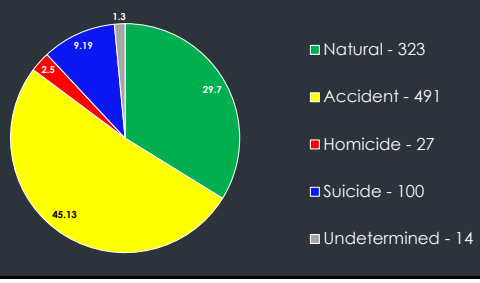
Establishment of Ventura County ME Office

- Coroner office became medical examiner in 1974
- Current facility completed in 1996
- Dr. Christopher Young, Chief ME since July 2017
- Independent agency in 2019, previously in HCA

8

2022: approx. 6,782 deaths
2091 reported (30%)/ 1088 JA (52%)
805 Exams → 549 Autopsies



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2022

- 278 overdose deaths
  - 253 accident, 18 suicide, 7 undetermined
  - 74% men
- 10% increase in fentanyl related deaths
  - Methamphetamine related deaths increased, 66% of these involved fentanyl

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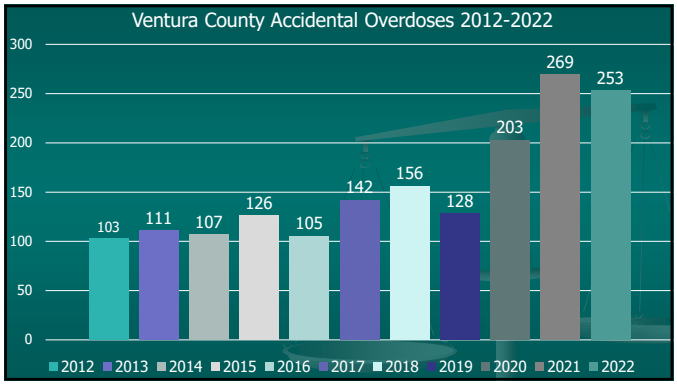

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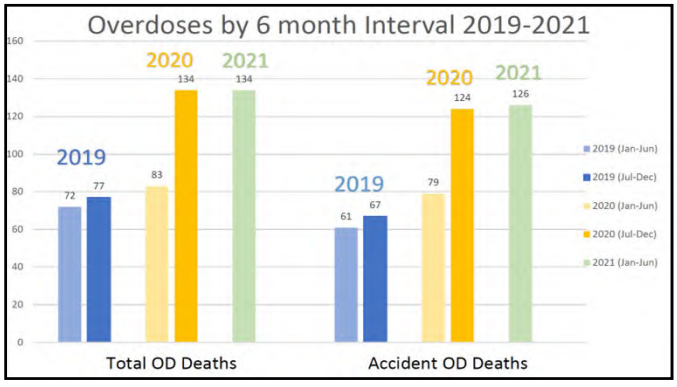

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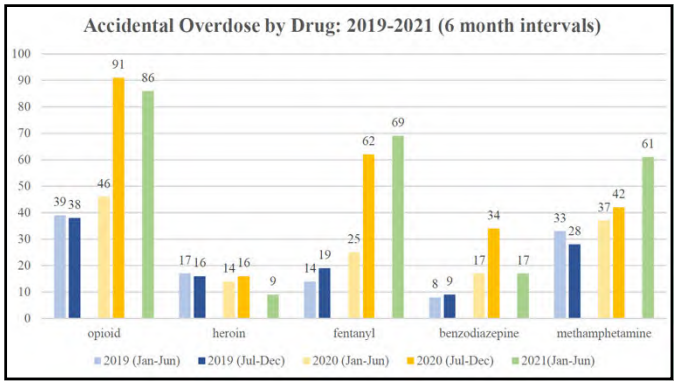

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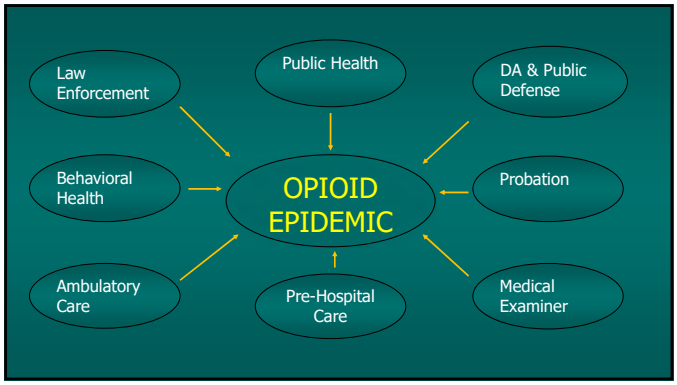
Best Practices by MEO

- Autopsies in majority of suspected OD's
- Urine screening in all suspected OD's
  - One-step drugs of abuse test cards
  - Prelim results communicated when requested
- Tox results turnaround ~ 6 weeks
- Autopsy report and causes of death completed in 2-3 months

14

- Annual drug overdose report produced
  - Drugs involved
  - Location of OD's
  - Demographics
  - Trends
- Shared with other agencies, media, public

15



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Collaboration with COAST

- County Opioid Abuse Suppression Taskforce
  - Born from prescription drug and heroin workgroup
- Agencies share and compare actionable data
- Information is leveraged and trends analyzed
- Respond to evolving crises

COAST
County Opioid Abuse Suppression Taskforce

17

- Obtained federal funding to solidify the taskforce
- Meet every other month, coordinate efforts for collective impact
  - Mission: to save and improve lives by measurably reducing opioid and illegal drugs across Ventura County

18

- "Prescribers Care" series: strategies for MD's and other health professionals
  - Train providers in addiction medicine, complementing addiction clinics
  - Chief ME helps educate at these
- Media and awareness campaigns
  - Traditional, digital, and location-based ads
  - fentanylventuracounty.org
  - "Real Talk: Fake Pills, 100% Danger" video

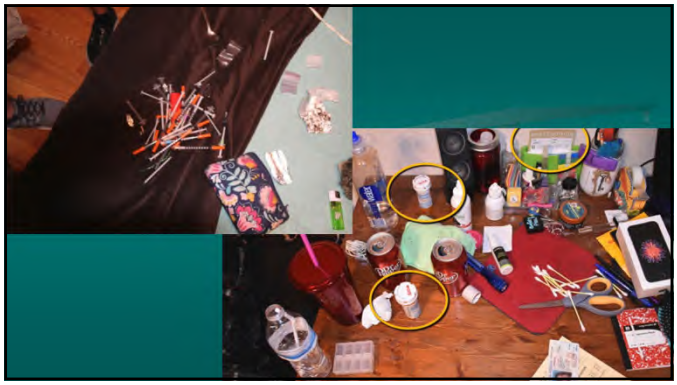
19

- Other presentations:
  - Educational presentations
    - Grand rounds, community hospitals
    - Death certification by clinicians, hospital reports of death
  - Town hall meetings, schools, other community events
  - Tours of facility – government leadership, county employees, students, other agencies

20

Death Scene Investigations

21



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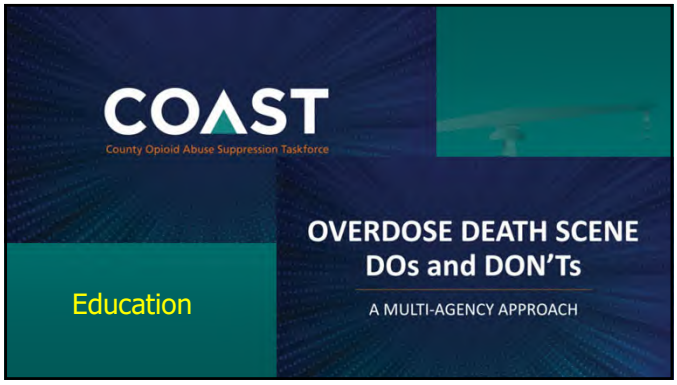

COAST
County Opioid Abuse Suppression Taskforce
OVERDOSE DEATH SCENE
DOs and DON'Ts
A MULTI-AGENCY APPROACH
Education

24

25

DON'T touch or move anything.

Once death is determined,
CA Code-Gov 27491 states:

- "The body shall not be disturbed."
- "The Coroner or Medical Examiner may take charge of any and all effects."

26

DO	DON'T
✓ Protect the evidence	X Wait to call the Medical Examiner's Office
✓ Limit number of people at the scene	X Cover the decedent
✓ Document thoroughly	X Touch or remove anything

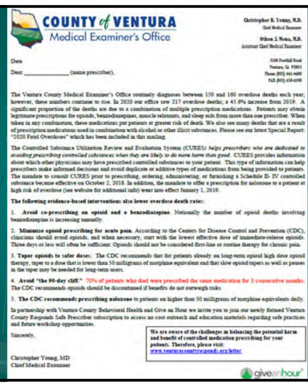
27

- Purposes of instructional video
  - Help educate and foster cooperation w/ other agencies
  - Help MEO better respond to death scenes
  - Proper death investigation ultimately helps all agencies involved

28

Letter to prescribers

- Courtesy letter
- Resources for safe prescribing
- 226 letters sent to date
- COAST facilitated



COUNTY of VENTURA
Medical Examiner's Office

Christopher B. Young, M.D.
Chief Medical Examiner
Othon J. Mena, M.D.
Assistant Chief Medical Examiner

[illegible]

Date
Dear ______________ (name prescriber),

The Ventura County Medical Examiner's Office routinely diagnoses between 150 and 160 overdose deaths each year; however, these numbers continue to rise. In 2020 our office saw 217 overdose deaths; a 45.6% increase from 2019. A significant proportion of the deaths are due to a combination of multiple prescription medications. Patients may obtain legitimate prescriptions for opioids, benzodiazepines, muscle relaxants, and sleep aids from more than one prescriber. When taken in any combination, these medications put patients at greater risk of death. We also see many deaths that are a result of prescription medications used in combination with alcohol or other illicit substances. Please see our latest Special Report: "2020 Fatal Overdoses" which has been included in this mailing.

The Controlled Substance Utilization Review and Evaluation System (CURES) *helps prescribers who are dedicated to avoiding prescribing controlled substances when they are likely to do more harm than good.* CURES provides information about which other physicians may have prescribed controlled substances to your patient. This type of information can help prescribers make informed decisions and avoid duplicate or additive types of medications from being provided to patients. The mandate to consult CURES prior to prescribing, ordering, administering, or furnishing a Schedule II- IV controlled substance became effective on October 2, 2018. In addition, the mandate to offer a prescription for naloxone to a patient at high risk of overdose (see website for additional info) went into effect January 1, 2019.

The following evidence-based interventions also lower overdose death rates:

1. **Avoid co-prescribing an opioid and a benzodiazepine.** Nationally the number of opioid deaths involving benzodiazepine is increasing annually.

2. **Minimize opioid prescribing for acute pain.** According to the Centers for Disease Control and Prevention (CDC), clinicians should avoid opioids, and when necessary, start with the lowest effective dose of immediate-release opioids. Three days or less will often be sufficient. Opioids should not be considered first-line or routine therapy for chronic pain.

3. **Taper opioids to safer doses.** The CDC recommends that for patients already on long-term opioid high dose opioid therapy, taper to a dose that is lower than 50 milligrams of morphine equivalent and that slow opioid tapers as well as pauses in the taper may be needed for long-term users.

4. **Avoid "the 90-day cliff."** 70% of patients who died were prescribed the same medication for 3 consecutive months. The CDC recommends opioids should be discontinued if benefits do not outweigh risks.

5. **The CDC recommends prescribing naloxone** to patients on higher than 50 milligrams of morphine equivalents daily.

In partnership with Ventura County Behavioral Health and Give an Hour we invite you to join our newly formed Ventura County Responds Safe Prescriber subscription to access no cost outreach and education materials regarding safe practices and future workshop opportunities.

Sincerely,

Christopher Young, MD
Chief Medical Examiner

We are aware of the challenges in balancing the potential harm and benefit of controlled medication prescribing for your patients. Therefore, please visit: www.venturacountyresponds.org/letter

giveanhour

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Collaboration with State (CDPH)

- Suspected drug overdose detection program
- Work towards near real-time surveillance
- Form for each suspected OD death
  - Completed and emailed within 30 days

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Suspected Overdose Death Detection FORM

Please email this FORM to cal-enhanced@cdph.ca.gov within 30 days of death; cc: kristy.arthur@cdph.ca.gov

County of Death *Ventura*
Date of Death
Date of Birth
Local Case Number
First Initial of Last Name
Age
Sex ◯ Male ◯ Unknown ◯ Female ◉ Other

Is this a *suspected* **opioid** overdose?

◉ Yes, only opioids or opioids and non-opioids are suspected.
◯ No, we only suspect non-opioid drugs.

A *suspected* drug overdose death must have at least 1 of the following 5 criteria (select all that apply):

1. ☐ Evidence at the scene were present and suggestive of drug use:
   - ☐ Misuse of prescription drugs (e.g. pills, prescription bottle, vial, patch, liquid)
   - ☐ Illicit drugs and/or drug paraphernalia (e.g. powder, tar, counterfeit pills, illicit packaging, straw)
   - ☐ Evidence of intravenous drug use (e.g. needles, syringe, tourniquet, cookers, filters)
   - ☐ Clinical scene evidence of drug overdose (e.g. foam cone, track marks, position of the body)
   - ☐ Other:
2. ☐ History of prescription misuse or illicit drug use (e.g. medical history, report of previous drug-related overdose, reported history by family/friends, or history of drug-related arrests):
   - ☐ Prescription ☐ Illicit ☐ Other:

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A *suspected* drug overdose death must have at least 1 of the following 5 criteria (select all that apply):

1. ☐ Evidence at the scene were present and suggestive of drug use:
   - ☐ Misuse of prescription drugs (e.g. pills, prescription bottle, vial, patch, liquid)
   - ☐ Illicit drugs and/or drug paraphernalia (e.g. powder, tar, counterfeit pills, illicit packaging, straw)
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   - ☐ Clinical scene evidence of drug overdose (e.g. foam cone, track marks, position of the body)
   - ☐ Other:
2. ☐ History of prescription misuse or illicit drug use (e.g. medical history, report of previous drug-related overdose, reported history by family/friends, or history of drug-related arrests):
   - ☐ Prescription ☐ Illicit ☐ Other:
3. ☐ Witness report of decedent using drugs:
   - ☐ Prescription ☐ Illicit ☐ Other:
4. ☐ (Preliminary) Autopsy findings were consistent with a drug overdose:
   - ☐ Pulmonary edema
   - ☐ Track marks
   - ☐ Injection sites (not due to medical interventions)
   - ☐ Foam cone
   - ☐ Other:
5. ☐ (Preliminary) Toxicology findings were consistent with a drug overdose:
   - ☐ Findings:

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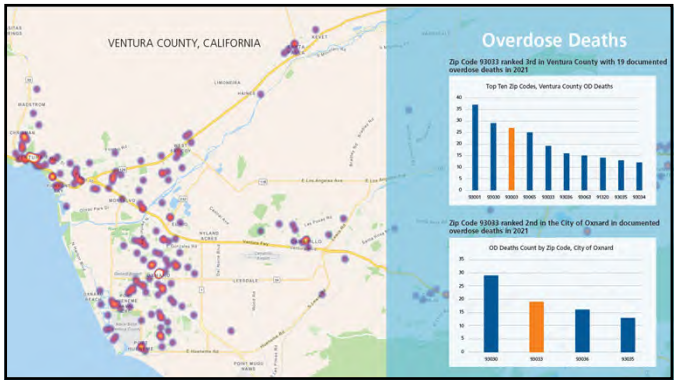

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Data in Action – Example

- Received info of increase in unhoused people and drug use / OD's in an area
- Reviewed EMS response & incidence of OD's (heat map)
- → Set up new exchange site, bilingual staff, worked w/ local businesses
- Result: fast-tracked support to underserved group

34

- Identify zip codes with greater opioid Rx's
  - -> greater susceptibility to fentanyl/opioid abuse
  - Rx rate per pharmacy / per physician
- Heat Maps
  - Use OD data from MEO and EMS
  - Naloxone use data included
  - Map adjusts every 24 hours

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Why Collaboration Works!

- "System Level Changes"
  - OD death investigation clarified and overhauled
  - Feedback loop process, e.g. letters to prescribers
- Pre-conditions for success
  - Quality data
  - Willingness to share data
  - Open to improvement, without blaming

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- ME Office Participation is KEY
  - Other agencies believe this
- Opioid crisis has brought agencies together more
  - Get ahead of problems together
  - All agencies have similar goals
- All LE and rescue personnel trained and outfit w/ naloxone

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- COAST program ongoing for 6 years
- Agencies continue to join
  - Probation, public defender, county CEO, county supervisor
  - **The **leaders** of the agencies attend, not representatives
- Participation => community benefits
- Won't get left out (no "FOMO")

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Potential Obstacles

- Some jurisdictions may not care or "it's not our problem"
  - Seen as a moral failure by those affected
  - Politics
  - NPO's taking on the work without collaboration
- Key figures not personally affected by crisis

40

Ongoing Goals

- Increase number of naloxone rescue kits distribution
  - Including upon release from custody
- Prosecute dealers whose drugs result in death
- * Reduce unintentional opioid overdoses by 50% compared to 2013 stat of 93

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Conclusions

- The VCMEO presents a model of interagency collaboration
- Common goals, leadership, funding and communication
- Overall PH benefit to served community
  - Drug use identification
  - Data collection
  - Prevention and anticipation
  - Education and treatment

42

- ME more than "just" submitting COD's
  - Cannot hope someone will do "something" with the data
  - Must go out and facilitate education with the data
  - Be included in decision making and planning
  - Contacted for data directly
  - Active participant of overall community's PH
  - Be not just death certifiers but also PH officers – Dr. Tom Gilson

43

- About half of California forensic pathologists don't directly certify deaths
  - Filled by coroners, funeral homes
  - Leads to reduced PH role
- Determined and inspired to overcome this in Ventura County
  - Remarkable to people who have worked in other counties, who believe it would not be possible elsewhere
  - Fentanyl crisis is not unique to VC, but our response is

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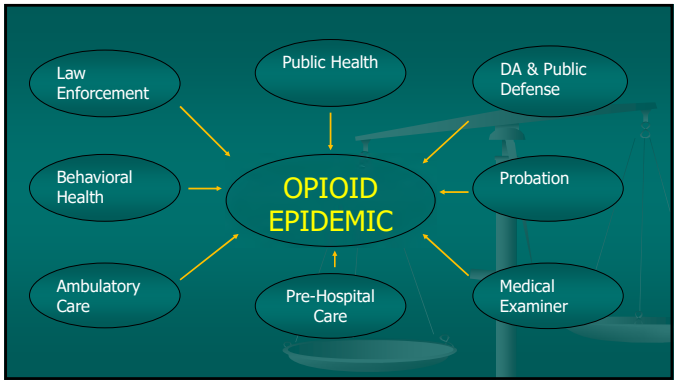

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- Acknowledgements
  - Ventura County ME Office Staff
  - Dan Hicks, COAST Manager
  - Victor Fazio, Asst. Sheriff
  - Brad Friday, COAST Data Management Coordinator
  - Ashley Nettles, NPO – Overdose Prevention

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Fentanyl Deaths in Infants/Children: A Case Series

KATIE MONDAY, MD

BRANDY SHATTUCK, MD; KRISTIE BARBA, M.S. D-ABFT-FT; CAROLYN REVERCOMB, MD

1

Objectives

Examples of fentanyl positive pediatric cases, timeline of investigation, notifications of outside agencies

Pediatric metabolism

Relative therapeutic and toxic concentrations by age group

Resources available for more information on fentanyl (and other drugs) in the pediatric population

2

2022-2023 Case examples

Total of five cases
- 11 mo M, 2 yo F, 13 yo F, 15 yo M, 17 yo F

Initial reports
- Co-sleeping, unresponsive in bed, witnessed to go unresponsive after vague illness complaints, known substance user

Autopsy
- Relatively unremarkable
- Pulmonary and cerebral edema
- Minor infections (rhinovirus/enterovirus, parainfluenza 3)

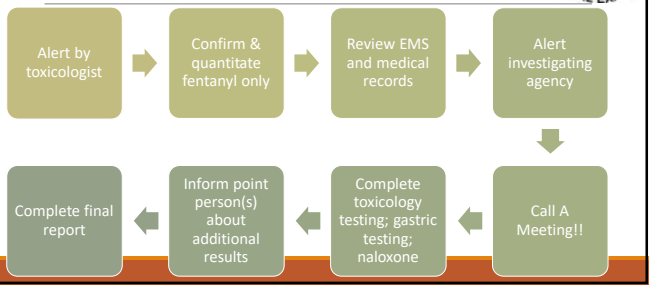
3

Toxicology

	11 months	2 years	13 years	15 years	17 years
Fentanyl (ng/mL)	69 (IVC)	46 (IVC)	5.7 (Femoral)	2.5 (Femoral)	4.1 (Femoral)
Other substances	4-ANPP Acetaminophen	4-ANPP Norfentanyl Cocaine (gastric)	None	Methamphetamine Acetaminophen Cannabinoids	Benzoylecgonine Xylazine Diphenhydramine Acetaminophen Ethyl alcohol Cannabinoids

4

Timeline of Investigation/Notifications



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Pediatric Fentanyl Metabolism

ZIESENITZ VC, VAUGHNS JD, KOCH G, ET AL. PHARMACOKINETICS OF FENTANYL AND ITS DERIVATIVES IN CHILDREN: A COMPREHENSIVE REVIEW. *CLIN PHARMACOKINET.* 2018;57:125-149

Intravenous, epidural, transmucosal, transdermal

Kidney disease, cardiopulmonary bypass, obesity

Differences in clearance and volume of distribution

Increased hepatic blood flow, altered protein binding, maturity of CYP enzymes

6

Most important take away points

ZIESENITZ VC, VAUGHNS JD, KOCH G, ET AL. PHARMACOKINETICS OF FENTANYL AND ITS DERIVATIVES IN CHILDREN: A COMPREHENSIVE REVIEW. *CLIN PHARMACOKINET.* 2018;57:125-149

1. Intravenous administration
   - IV bolus (~30 µg/kg) = Plasma concentrations infants < children < adults
   - Infants/children are not more suspectable to respiratory depression compared to adults
2. Transmucosal administration
   - Maximal fentanyl concentration lower in children compared to adults
   - Children reach max concentration faster than adults
3. Transdermal administration
   - Children similar to adults

7

Therapeutic Concentrations

INTRAVENOUS

Neonates	Adults
Bolus (1 mcg/kg): peak 2.21-3.61 ng/mL	Bolus (2-6.4 mcg/kg): peak 11-18 ng/mL
Bolus (30 mcg/kg): 8.7-12.5 ng/mL (0.5 hr)	Bolus (2-6.4 mcg/kg): <1 ng/mL (1-1.5 hr)
Continuous infusion (1 mcg/kg/hr): 0.42-0.61 ng/mL	Continuous infusion (1 mcg/kg/hr): 1.6 ng/mL

INTRANASAL

Infants/Children (9 month-6 year)	Adults
2 mcg/kg peak : 0.24-1.43 ng/mL (1 min)	1-10 mcg/kg peak: 0.7-2.8 ng/mL (11-21 min)

8

Toxic Concentrations

Age	Blood Concentrations (ng/mL)		
	Average	Median	Range
Infants (≤1) (n=14)	25.8	17	4.8 – 91
Children (>1-8) (n=13)	21.9	20	0.3 – 73.5
Teen (12-17) (n=8)	4.9	4.6	2.5 - 10
Adult (Baselt)	8.3		3.0-28

9

Notes

Naloxone works in Infant/children

Lactation

Gastric testing

10

Resources

National Library of Medicine
- Drugs and Lactation Database
- Mother to Baby Fact Sheets

NAME Pediatric Toxicology Reporting System
- https://pedtox.orainc.com/login.php

Clinical Toxicology Partners/Poison Control Centers

11

Important points

The death of an infant/child from fentanyl is rarely suspected

Infants/children have distinct fentanyl pharmacokinetics compared to adults

Communication!

12

Final Thought

GAITHER JR, NATIONAL TRENDS IN PEDIATRIC DEATHS FROM FENTANYL, 1999-2021. *JAMA PEDIATRICS.* 2023;177;733-735

"In 1999, approximately 5% of (pediatric) deaths from opioids were from fentanyl. By 2021, 94% of (pediatric) opioid deaths were attributed to fentanyl"

13

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Thank you

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Lessons About the State of Health Care, Malpractice, and Quality Assurance Learned from Private Autopsy Performance

Samuel P Prahlow,[1] Taylor Wilson, [2] Brilyn Baker, [2] Madison Wilson, [2] Amy C Gruszecki [2]
Philadelphia College of Osteopathic Medicine – South Georgia, Moultrie, GA[1]
American Forensics, Mesquite, TX[2]

1

Disclosures

The authors have no financial disclosures that would be potential conflicts of interest with this presentation.

2

Introduction

- Decline of autopsy discussed extensively in literature
  - 1972: 19% of deaths
  - 2007: <7% of deaths
- Potential Reasons
  - 1970: Joint Commission removed accreditation process
  - 1986: Medicare stopped paying
  - Advanced Imaging impact on clinical reasoning?
- Private autopsies seen as pitfalls by clinicians due to potential of increased litigation

3

What are Private Autopsies?

- Requested by family member
- May have been declined by a ME office
- May have been declined by a hospital
- May be a second autopsy

4

Literature Review – Autopsies have value

- Autopsies (in general):
  - 2014 study: compared clinical and autopsy diagnoses over a five-year period
    - Major differences in 24% of cases
    - Minor differences in 33% of cases

5

Literature Review – another study

- Private Autopsies
  - Regional office over 12-year period
    - Private cases per year: 20 cases on average
    - Total cases per year: 300 cases on average
- It is hard to know if this is an average number of private cases for an office or an outlier as these data are not readily available for many offices

6

Materials and Methods

- Retrospective study: 2013-2018 cases
- American Forensics
  - Families, attorneys, hospitals
  - Federal, state, and county governments
  - Forensic and private cases

7

Materials and Methods

- All exams performed by American Board of Pathology Certified or Board eligible Forensic Pathologists.
- All interviews performed by ABMDI certified or in-training medical legal death investigators.

8

Materials and Methods

- Facility is Accredited by National Association of Medical Examiners.
- Facility is Accredited by ANAB to ISO17020.

9

Materials and Methods

- All charts reviewed:
  - Investigative reports
  - Autopsy reports
  - Evidence of reports to medical examiners
  - Attorney involvement

10

Materials and Methods

- Inclusion criteria: All private autopsies
  - Excluded: non-private cases
    - Forensic (county or neuro only)
- Data extracted:
  - Reasons cited for autopsy
  - Evidence of litigation
  - Overlap with Medical Examiner's Office cases

11

Variable Name	Valid Variable Values
Year	2013, 2014, 2015, 2016, 2017, 2018
Case Number	Free-text
Cause of Death	Free-text
Manner of Death	Natural, Accident, Suicide, Homicide, Undetermined
Reasons for Autopsy	
Better Understanding Cause of Death	Yes, No & *Free Text* if yes
Concern of Possible Injury/Homicide	Yes, No & *Free Text* if yes
Concerns About Medical Malpractice	Yes, No & *Free Text* if yes
Info for Future Generations	Yes, No & *Free Text* if yes
Litigation	
Attorney Involvement	Yes, No
Attorney Meeting/Call	Yes, No
Deposition/Court	Free-text
Records Requested	Yes, No
ME/JP Involvement	
Report to ME/ JP	Yes, No
Second Autopsy (ME or hospital)	Yes, No

12

Variable Name	Valid Variable Values
Year	2013, 2014, 2015, 2016, 2017, 2018
Case Number	Free-text
Cause of Death	Free-text
Manner of Death	Natural, Accident, Suicide, Homicide, Undetermined
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Reasons for Autopsy	
Litigation	
MEJP Involvement	
Report to ME/ JP	Yes, No
Second Autopsy (ME or hospital)	Yes, No

15

Results

- 2013-2018 Total Cases: 2,354
  - Private Cases: 726
    - 79 to 144 per year; 121 average

Manner of Death	Number of Cases	Percent of Cases
Natural	634	87%
Accident	58	8%
Suicide	15	2%
Undetermined	10	1%
Homicide	9	1%

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Cause of Death Classification	Number of Cases	Percent of Cases
Cardiovascular	391	54%
Cancer	76	10%
Respiratory	71	10%
Multisystem	40	6%
Gastrointestinal/Metabolic	39	5%
Trauma	24	3%
Infection	23	3%
IUFD	22	3%
Neurological	13	2%
Toxic Drug Effects	10	1%
Prematurity	6	1%
Nephrological	5	1%
Undetermined	3	0%
Endocrine	2	0%
Rheumatologic	1	0%

17

Reasons for Autopsy Results

Reasons for Autopsy	Number of Cases	Percent of Cases
Better Understanding	679	94%
Medical Malpractice Concern	274	38%
Genetic Information	95	13%
Injury/Homicide Concern	90	12%

Number of Reasons	Number of Cases	Percent of Cases
0	4	1%
1	335	46%
2	359	49%
3	27	4%
4	1	0%

18

Reasons for Autopsy Results

Reason for Autopsy	Number of Cases	Percent of Cases with 1 Reason	Percent of Total Cases
Better Understanding	299	89%	41%
Medical Malpractice Concern	18	5%	2%
Injury/Homicide Concern	13	4%	2%
Genetics	5	1%	1%

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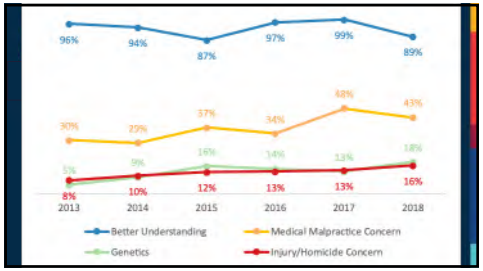

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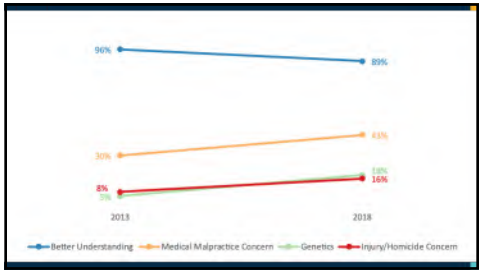

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Medical Malpractice & Litigation

- Concern of medical malpractice:
  - 38% (274/726) cases

Variable	Number of Cases	Percent of Cases
Attorney Involved From Start	60	8%
Records Request	29	4%
Attorney Meeting	26	4%
Court Testimony	9	1%

22

Medical Malpractice & Litigation

- Concern of medical malpractice:
  - 38% (274/726) cases

Variable	Number of Cases	Percent of Cases
Attorney Involved From Start	60	8%
Records Request	29	4%
Attorney Meeting	26	4%
Court Testimony	9	1%
Total Cases with Involvement	69	9%

23

Association with other ME Offices

Variable	Number of Cases	Percent of Cases
Second Autopsy	61	8%
Report to ME/JP	39	5%
Non-Natural Manner of Death	82	11%

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Discussion – Lesson 1

- Overall – our study shows families order private autopsies because they want to better understand why their loved one died.
- Is this a failure of the health care system to communicate or lack of understanding by family member?

25

Discussion – Lesson 2

- Private autopsies can provide information if a decedent's family has concerns
  - If the ME did not immediately release results after a primary exam
  - Or if the ME did not do an exam

26

Discussion – Lesson 3

- Private autopsies provide Quality Assurance to the local Death Investigation system
  - 82 cases (11%) non-natural manner of death (suicide, homicide, accident).
  - 59 cases (8%) were not previously autopsied.
  - Private exam was performed by Forensic Pathologist, accredited facility, should reassure the ME.

27

Discussion – Lesson 4

- Concern for medical malpractice was 274 (38%) at the beginning of the case
- 69 (9%) attorney involvement at all
- 9 (1%) had evidence of court/deposition

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Limitations

- Only utilized data within the chart
  - Reasons were abstracted from interviews
  - Unstated reasons for autopsy could exist
  - Litigation potentially have occurred without our knowledge

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Future Study

- More similar studies to better characterize private cases in the United States
- Use of a better-defined intake survey for these types of cases can better glean useful data for future use
- COVID impact on private autopsies

30

Conclusions/Considerations

- Our study helps better characterize private autopsies in United States.
- Decline of autopsy may be related more to lack of availability rather than lack of desire for exam.

31

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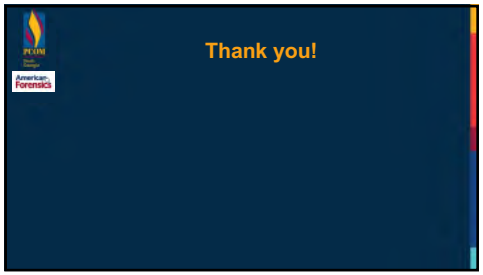
Thank you!

UTILIZING THE ABBOTT ID NOW AS A POST-MORTEM SCREENING TEST FOR COVID-19 IN DECEDENTS AT THE COBB COUNTY MEDICAL EXAMINER'S OFFICE

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1

ABBREVIATIONS

CCMEO = Cobb County Medical Examiner's Office

CDPH = Cobb & Douglas Public Health

GPHL = Georgia Department of Public Health

CSTE = Council of State and Territorial Epidemiologists

CDC = Centers for Disease Control

RVP = Respiratory Viral Panel

POC = Point-of-care

CRV = Common Respiratory Virus

ME = Medical Examiner

SN = Sensitivity

SP = Specificity

PPV = Positive Predictive Value

NPV = Negative Predictive Value

2

BACKGROUND

3

CCMEO-CDPH PROJECT

All accepted jurisdiction cases at CCMEO received:

1. On-site COVID-19 testing via Abbott ID NOW platform
2. COVID-19/Influenza Multiplex testing via GPHL
3. Additional RVP testing via GPHL

4

ABBOTT ID NOW TESTING

- Requires nasopharyngeal, nasal, or throat swab
- Returns results in under 15 mins
- Protocol includes placing bases in machine, 3 min warming period, sample swab twirled in test liquid, test liquid transferred to testing base, and close the lid.
- Initially, protocols were followed exactly as outlined by Abbott

5

GPHL TESTING

Requires respiratory swab placed in VTM, refrigerated, labelled, and transported to GPHL

CDC Influenza SARS-CoV-2 (Flu SC2) Multiplex

Respiratory Viral Panel

- Illumina Respiratory Virus Oligos Panel V2 (Jan 2021-Jul 2022)
- Thermo Fisher TrueMark Respiratory Panel 2.0 (Aug 2022-Dec 2022)

Results return within 2-14 days

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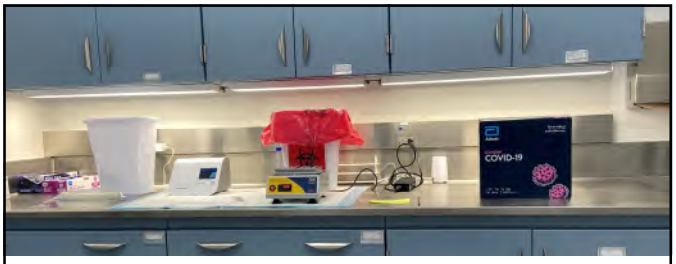

RESULTS

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INITIAL ID NOW RESULTS

Most molecular tests not intended for morgue use

Abbott ID NOW protocols recommend only testing those "…who are suspected of COVID-19 by their healthcare provider within the first seven days of the onset of symptoms."

By following ID NOW protocols exactly:

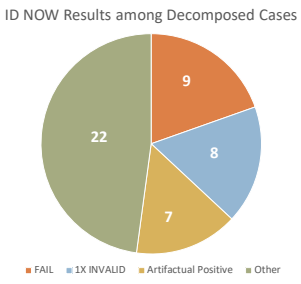
- INVALID/FAIL results were common for CCMEO cases
- Discordant results when compared to GPHL tests were also common
- Both were especially common in decomposed cases

8

DECOMP RESULTS

46 cases tested

- All INVALID and artifactual positive results are tested again with a fresh swab
- 2X INVALID is considered a FAIL
- Positives resulting within 15-20 seconds of run time are considered artifactual



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PROTOCOL MODIFICATIONS

Abbott ID NOW Protocols

1. Refrigerated samples must be warmed to room temperature prior to testing
2. INVALID errors are rare
3. In case of INVALID, remaining liquid in the sample receiver may be used to run an additional test

Post-Mortem Modifications

1. Heating block was utilized to warm samples (min 3 mins, max 60 mins)
2. Moderate to severe decomposition cases were excluded from ID NOW testing
3. Fresh swabs are taken in case of INVALID result

10

CALCULATIONS

- Prevalence = $\frac{TP}{total\ cases\ tested}$
- Specificity (SP) = $\frac{TN}{TN+FP}$
- Accuracy = $\frac{TP+TN}{total\ cases\ tested}$
- Positive Predictive Value (PPV)=$\frac{TP}{TP+FP}$
- Sensitivity (SN) =$\frac{TP}{TP+FN}$
- Negative Predictive Value (NPV) = $\frac{TN}{TN+FN}$

NOTE: TP = true positives, TN = true negatives, FP = false positives, FN = false negatives

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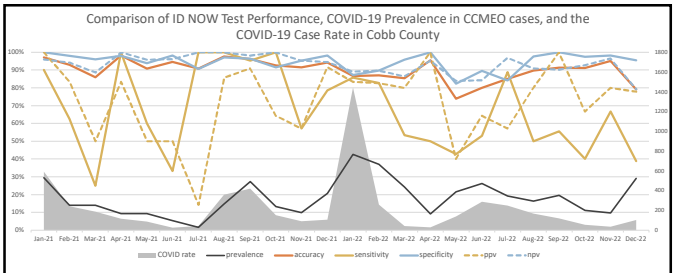

ID NOW PERFORMANCE

89.9% Accuracy
69.9% SN
94.5% SP
74.4% PPV
93.2% NPV

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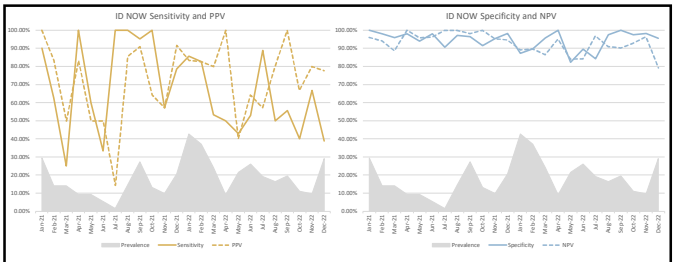

A CLOSER LOOK

- SN and PPV falls during low COVID-19 prevalence
- SP and NPV remain stable

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DISCUSSION

POC testing is not necessarily the norm at ME offices

Stability of SP and NPV prove the ID NOW can be utilized as a screening test, requiring additional testing for diagnostic results

Costs associated with running 1 test is approximately $48

Few cases of transmission from deceased individual to a person that handled their body, but could be important in case of more infectious variants

Results contributed to COVID-19 and other respiratory viral surveillance performed by public health

14

ACKNOWLEDGEMENTS

CSTE
CDC
GDPH
GPHL
CCMEO
CDPH

15

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16

Housing Crisis-Related Fatalities in King County, Washington

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Seattle, WA

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Disclosures

Neither Dr. Nicole Jackson nor Dr. Nicole Johnson have or have had relationships with ineligible entities to disclose.

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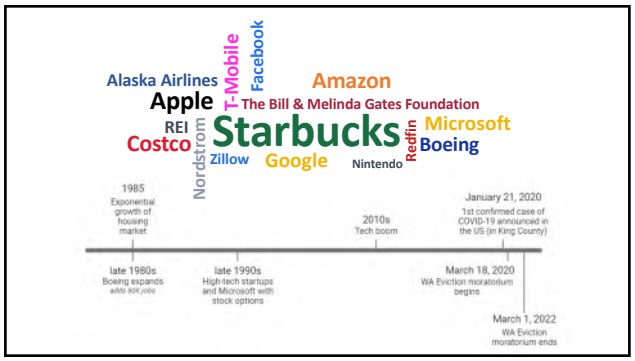

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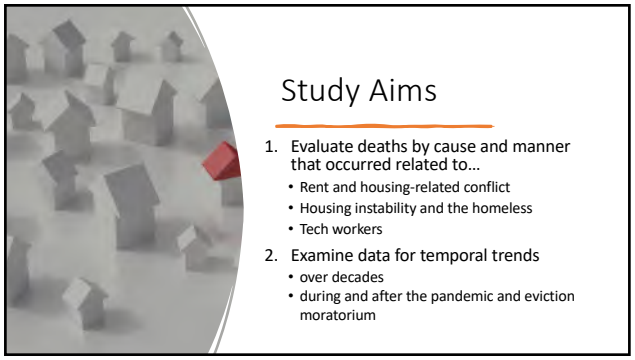

Study Aims

1. Evaluate deaths by cause and manner that occurred related to…
   - Rent and housing-related conflict
   - Housing instability and the homeless
   - Tech workers
2. Examine data for temporal trends
   - over decades
   - during and after the pandemic and eviction moratorium

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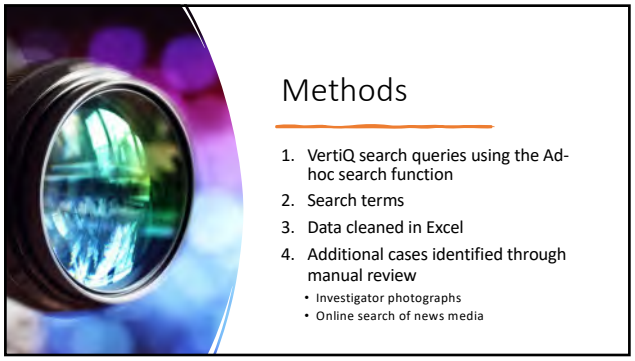


Methods

1. VertiQ search queries using the Ad-hoc search function
2. Search terms
3. Data cleaned in Excel
4. Additional cases identified through manual review
   - Investigator photographs
   - Online search of news media

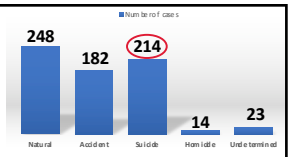
6

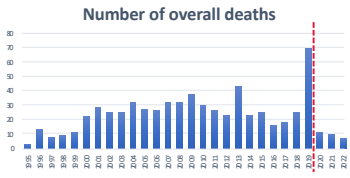
7

All tech workers

Search
- Employment Status, Employer, Kind of Business Industry
- Named major technology companies
- "engineer", "tech", "computer", "program", "code"

Results
- 681 deaths
- Average age = 42.2 years (19-64)





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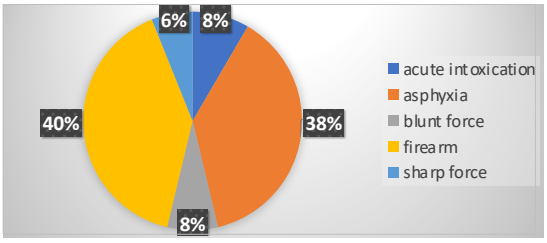
Tech suicides

Average age = 40.5 years (19-63)



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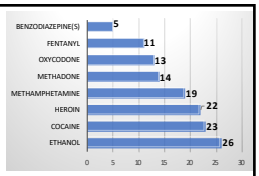
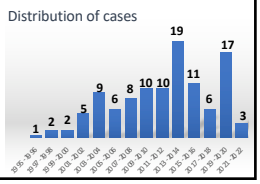
Tech acute intoxications

- n = 109
- Average age = 39.9 years (22-61)
- 78% Accidental (n = 85)
  - 18 suicides, 6 undetermined
- 60% of all accidental deaths

Drug trends

- Stimulant use throughout
- 2001-2019: heroin-involved
- 2016: 1st fentanyl-associated death
  - Regular involvement in 2019





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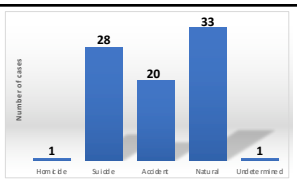
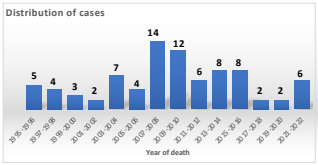
Microsoft

- Most named employer *n= 83*
- MC COD = Cardiovascular disease *n = 19*
- Accidents
  - 11 Traffic-related deaths
  - 8 fatal intoxications
    - Cocaine most named
    - No fentanyl-related deaths
  - 1 bathtub drowning





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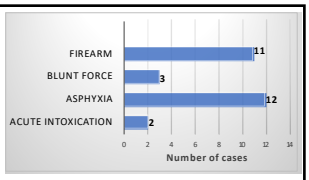
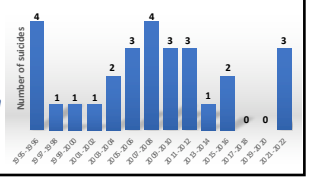
Microsoft suicides

- Average age: 38.7 (21-50) years
  - M >F
- No predominance of one job type
  - 6 engineers and 6 programmers
  - 5 managers
  - 3 technicians
  - 8 unspecified jobs
- Most sited stressors:
  - Work stress and lost/losing job *n= 3 each*
  - Relationship problems at home *n= 2*





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Microsoft homicides - victims

1 case identified in our database search:

1. 2008: 36F Xbox video game programmer, COD = GSWs
   - Homicide-suicide by husband (also a Microsoft video game programmer) after an affair

Additional case found by manual search online:

1. 2002: 25M lead program manager, COD: Sharp force injuries (>200)[1]

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13

Microsoft homicides - assailants

1 case identified in our database search:

1. 2008: 36M video game programmer, COD = GSW head

Cases found by manual search online:

1. 2021: 20F girlfriend of 23M software engineer, COD = sharp force wounds
2. 2019: 33M former contract worker, carjacking and shooting rampage that kills 2 (CODs: BFIs and GSWs)
3. 2019: 34M Microsoft worker killed parents over selling their home (CODs: GSWs)

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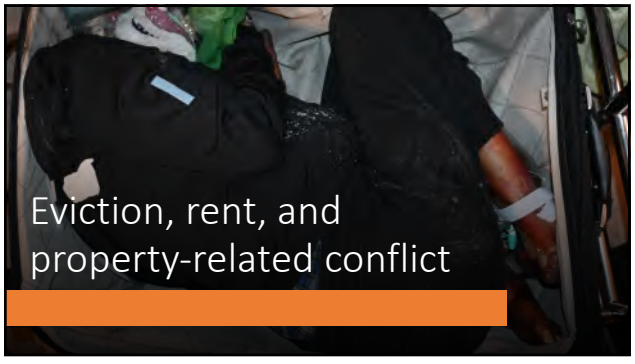


15

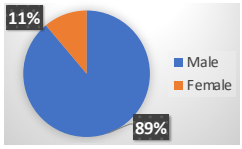
Eviction-related fatalities

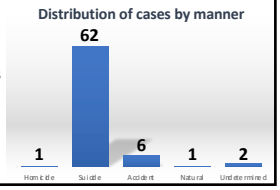
Search criteria

- Fields: Death Summary, Death title, Narrative
- Search terms: "Eviction" and "finan"

- Inclusion criteria
  - Includes mention of eviction as a stressor
- Exclusion criteria
  - Incidental deaths on serving of eviction notices
  - Unspecified financial issues

- 72 total cases
  - Average age = 51.4 years (20-77)





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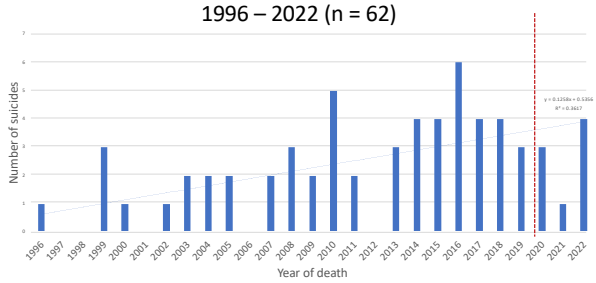
Eviction-related suicides in King County, WA

1996 – 2022 (n = 62)



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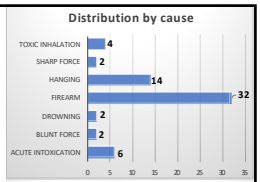
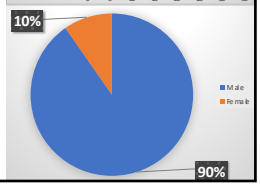
Eviction-related suicides

- Average age = 52.8 years (20-77)
- 4 Police-related
  - 2018 – SWAT involved due to history of mental health and multiple weapons; found dead with rifle wound of head after lighting house on fire
  - 2019 – woman took eviction served by deputy, walked into the bathroom, and shot herself
  - 2019 – heard to audibly shoot self while deputies serving the eviction notice were drilling down the door
  - 2023 – stand off during eviction





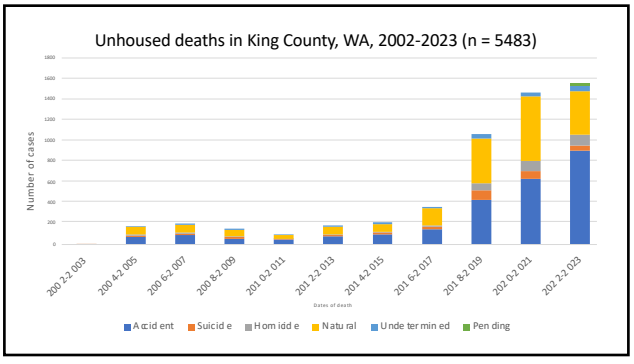
18

Other eviction-related fatalities

- 1 Homicide
  - 48M multiple stab wounds (chest x2) when him and a colleague were serving eviction to a resident (both men stabbed) *2020*
- 6 Accidents – all acute intoxications
  - 1998, 2005 x 2, 2010 x 2, 2019
  - Ages: 36-57, 2:1 (M:F)
- 3 Undetermined
  - (2002) Officer involved shooting at a hotel – shot by self and officer
  - (2011) Acute toxication with allegations of poisoning
  - (2023) Structure fire following eviction notice – site of future homicide

19

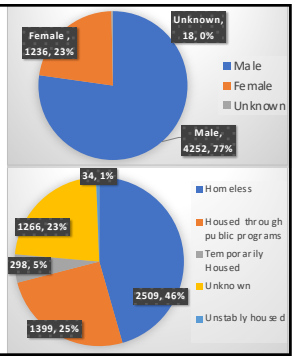
20



21

Homeless in Seattle

- King County Population = 2.27M
- King County homeless = >40K
  - 13.8% increase since 2020
  - Data collected is underreported
- Overrepresented:
  - Those with disabilities and mental health
  - Those with substance use disorder
  - AA (25%) and AI/AN (9%)…



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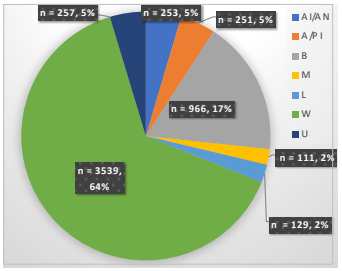
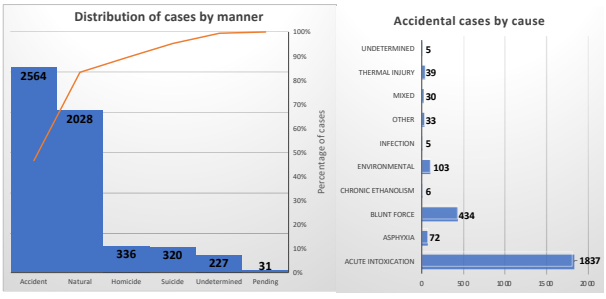


Per the 2022 Census:

- 63.5% White
- 21.7% Asian
- 10.5% Latino
- 7.4% Black
- 5.6% Mixed
- 1.0% American Indian or Alaska Native
- 0.9% Pacific Islander

U.S. Census Bureau quickfacts: King County, Washington; United States. QuickFacts King County, Washington. (n.d.). https://www.census.gov/quickfacts/fact/table/kingcountywashington,US/PST045222

23



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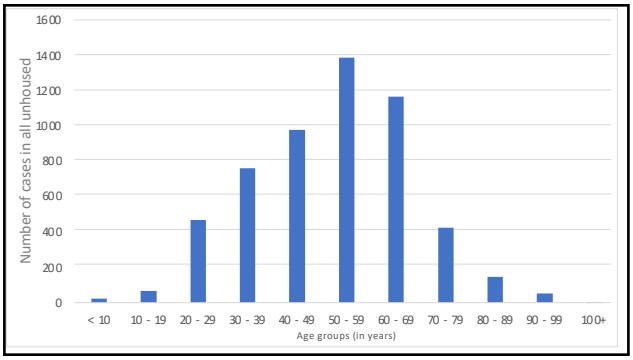
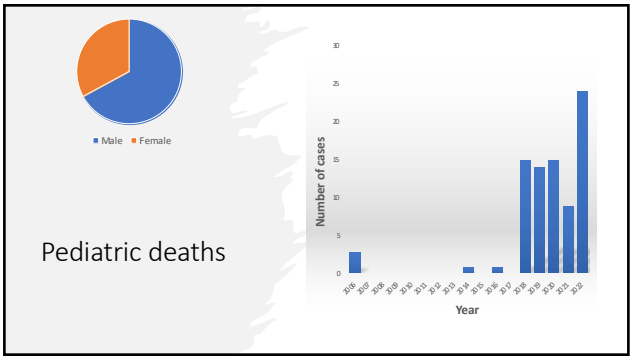
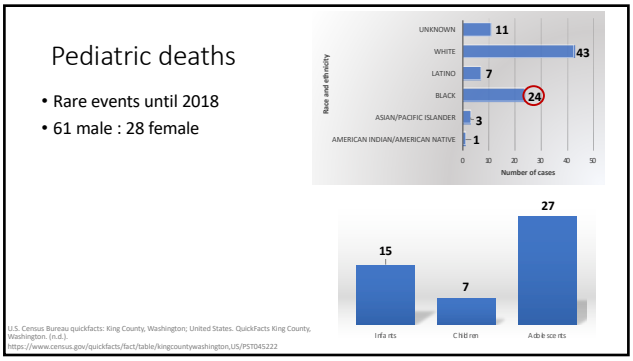

1600
1400
1200
1000
800
600
400
200
0
Number of cases in all unhoused
< 10
10 - 19
20 - 29
30 - 39
40 - 49
50 - 59
60 - 69
70 - 79
80 - 89
90 - 99
100+
Age groups (in years)

25


Male
Female
Pediatric deaths
Number of cases
Year

26

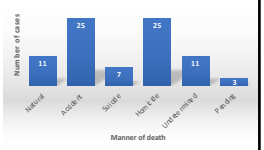

Pediatric deaths
• Rare events until 2018
• 61 male : 28 female
UNKNOWN
11
WHITE
43
LATINO
7
BLACK
24
ASIAN/PACIFIC ISLANDER
3
AMERICAN INDIAN/AMERICAN NATIVE
1
Race and ethnicity
Number of cases
15
7
27
Infants
Children
Adolescents
U.S. Census Bureau quickfacts: King County, Washington; United States. QuickFacts King County, Washington. (n.d.).
https://www.census.gov/quickfacts/fact/table/kingcountywashington,US/PST045222

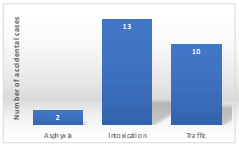
27

Pediatric Accidents

Accidents
- Average age = 16.3 years (0-19)
- 17 males : 8 females

Fatal intoxications *n = 15*
- 12 of 15 cases involving fentanyl
  - 8 cases of fentanyl only
- 1 homicide *heroin and meth in an infant*
- Only 1 case before 2018

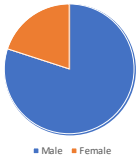




28

Pediatric Homicides

Homicides
- 1 infant death
  - *Acute heroin and methamphetamine intoxication (2018)*
- 2 non-accidental traumas in toddlers *(2022)*
- Else, average age of 17.4 years
  - Firearm = 19
  - Blunt + sharp force = 1
  - Sharp force = 1
  - Strangulation = 1



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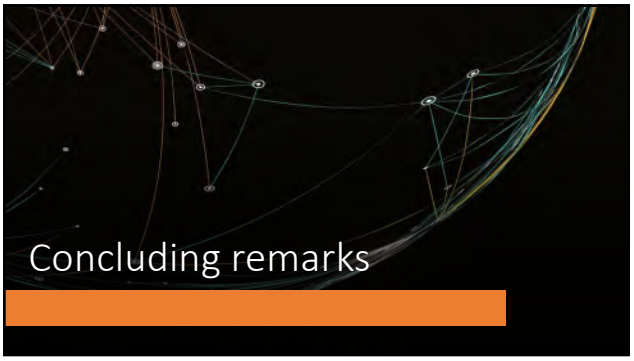


30

Conclusions

- Tech workers are at an increased risk of suicide
  - Important information for HR departments
    - Opportunity for mental health and wellness programs
  - Possible protective effect of working from home
- Evictions are stressful and becoming more combative
  - Time is not an effective diffusion tool
- Homelessness in King County is worsening
  - Financial crisis + drug epidemic + limited affordable housing
- Fentanyl more commonly involved in deaths of those without stable housing, but increasing in tech workers as well
- Deaths in children without stable housing is a new phenomenon
- Tech- and eviction-related findings are likely underestimates

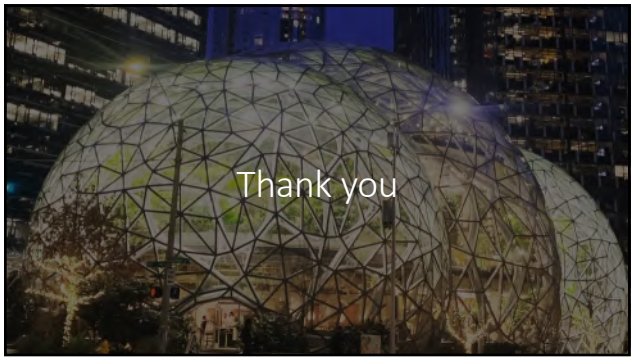
31

Limitations

Variability in information in investigative report
- Inconsistent reporting of job title
- Some details surface after examination
  - Landlord/tenants
  - Parents/children
  - Elderly/young

Limited search regarding "rent"
- "apparent" used in nearly every narrative
  - Used "eviction" as a proxy

32



33

Hereditary Thrombophilia as a Possible Risk Factor for Severe Disease in COVID-19: A Case Series

Jonathan Tse, BS[1]; Julita Gongolli, BS[1]; Joseph A. Prahlow, MD[2]
[1]Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, MI
[2]St. Louis University School of Medicine, Department of Pathology and the Office of the Medical Examiner, City of St. Louis, St.Louis, MO

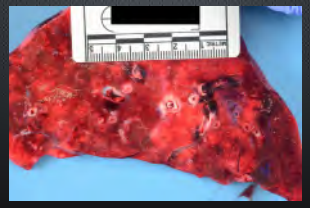
Case 1:

- CC: collapse
- Demographic: 49 year-old mixed-race white and African American male
- PMH: none
- Life-saving Interventions
  - CPR
  - 8x Epinephrine

Case 1: Autopsy Findings

- MTHFR C677T (heterozygous) and PAI-1 4G/5G (heterozygous) mutations
  - Bilateral pulmonary thromboemboli
  - Bilateral residual deep venous thrombi of lower extremities
- COVID-19 respiratory infection
- Hypertensive and atherosclerotic cardiovascular disease

Lung Slice



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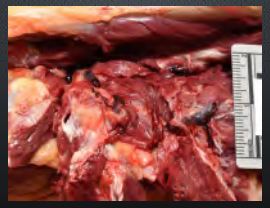
Leg Dissection



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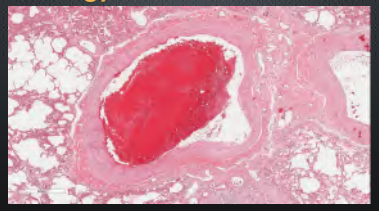
Lung Histology



PATHOLOGY

Case 1: Cause of Death

Pulmonary thromboembolism due to deep venous thrombosis due to a heterozygous MTHFR C667T mutation and a heterozygous PAI-1 4G/5G mutation with contributing causes of COVID-19 respiratory infection and hypertensive and atherosclerotic cardiovascular disease

Case 2:

- CC: shortness of breath and chest pain
- Demographic: 50 year-old white male
- PMH: GERD and nephrolithiasis
- Family History: sudden cardiac death in brother
- Social History: former smoker
- Life-saving Interventions
  - CPR, defibrillators, 2x epinephrine, 3x amiodarone, esmolol bolus
  - TPA, Aspirin, and Ticagrelor
  - Cardiac cath: LAD artery stent and Impella placement
  - Pressors: epinephrine, norepinephrine, vasopressin, and phenylephrine

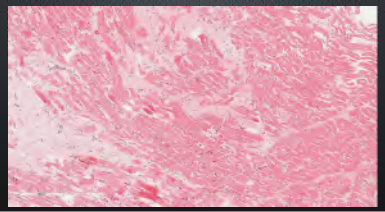
Case 2: Autopsy Findings

- Hypertensive and atherosclerotic cardiovascular disease:
  - Coronary artery atherosclerosis
    - Acute coronary thrombosis with acute myocardial infarct
    - Subsequent cardiac catheterization, removal of thrombus, and stent placement
- MTHFR A1298C (heterozygous) and PAI-1 4G/5G (homozygous) mutations
- Recent COVID-19 respiratory infection with residual patchy diffuse alveolar damage
- Emphysema

Cardiac Slices

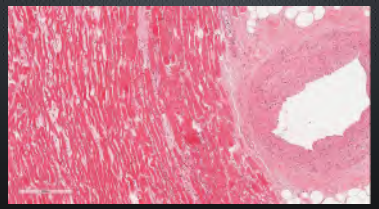
PATHOLOGY

Heart Histology



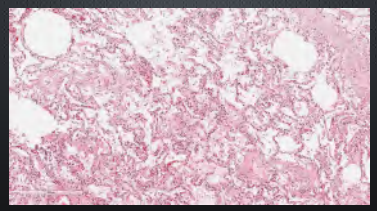
PATHOLOGY

Heart Histology



PATHOLOGY

Lung Histology



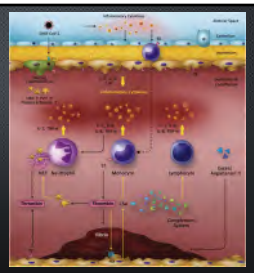
PATHOLOGY

Case 2: Cause of Death

Acute myocardial infarction due to coronary thrombosis due to hypertensive and atherosclerotic coronary disease with contributing causes of multiple thrombophilia disorders and recent COVID-19 respiratory infection

PATHOLOGY

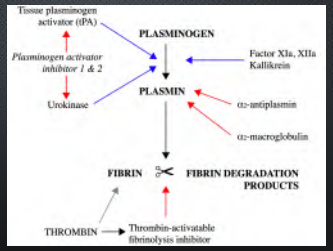
COVID-19 and Hypercoagulability



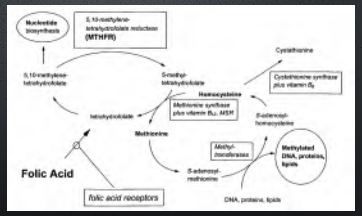
Abou-Ismail MY, Diamond A, Kapoor S, Arafah Y, Nayak L. The hypercoagulable state in COVID-19: Incidence, pathophysiology, and management [published correction appears in Thromb Res. 2020 Nov 26;:]. Thromb Res. 2020;194:101-115. doi:10.1016/j.thromres.2020.06.029

PATHOLOGY

PAI-1



MTHFR



Botto LD, Yang Q.
5,10-Methylenetetrahydrofolate reductase gene variants and congenital anomalies: a HuGE review. *Am J Epidemiol*. 2000;151(9):862-877.
doi:10.1093/oxfordjournals.aje.a010290

Conclusions

- The combination of multiple inherited and acquired thrombotic risk factors may significantly elevate one's risk of thrombosis.

Considerations:

- Hereditary thrombophilias as a risk factor for severe COVID-19
- Thrombophilia testing in COVID-19 patients with other risk factors for severe COVID-19 infection
- Thrombophilia testing at autopsy in COVID-19 patients identified with thrombi

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PATHOLOGY

3.6 Infectious Disease: A Re-emerging Global Public Health Threat.

Dr Alfredo E Walker HBM (Gold), FRCPath, DMJ (Path), MB, BS, MFFLM, MCSFS
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Department of Pathology and Laboratory Medicine
Faculty of Medicine, University of Ottawa
Forensic Pathologist and Coroner
Ontario Forensic Pathology Service

EORLA

Learning Objectives

By the end of the presentation, participants will be able to:

1. *Explain the reasons behind the re-emergence of infectious diseases.*
2. *Discuss the infectious disease epidemics of the last century.*
3. *Discuss the etiology, pathology and postmortem considerations of COVID-19 disease.*

Global Public Health Threats in the 21st Century

Many opportunities for GPHTs
- Highly mobile, interdependent and interconnected world
- Rapid spread of infectious diseases.
- Radionuclear threats.
- Toxic threats

IDs spreading much faster than at any time in history

An outbreak in one part of the world is only a few hours away from another part

Criteria for Establishment of Infectious Disease

- Infectious agent
- Vulnerable population
- Easy person-to-person transmission
- Self-sustainability of infection within the population

Zoonoses

- Zoonotic infection: Transmission of an infectious agent from an animal to humans.
- Increased risk of ZI with closer contact between humans and animal species for reasons already described
- Potential for serious threats to human health.

Emerging Infectious Diseases

IDs that have	Causes:
• Recently appeared within a population • Exhibited rapid increases in incidence/geographic range	• Previously undetected/unknown infectious agents • Known agents with spread to new geographic regions or populations • Re-emergence of infectious agents

Re-emerging Infectious Diseases

IDs that have reappeared after a significant decline in prevalence.

Causes:

- **Breakdown in public health control measures**
- **New strains of known pathogens (evolution)**
- **Human behavior**
  - Overuse of antibiotics →drug resistance
  - Population growth/Migration
  - International air travel
  - Poverty
  - Wars
  - Destructive ecological changes (economic development and land use)

WHO Warning

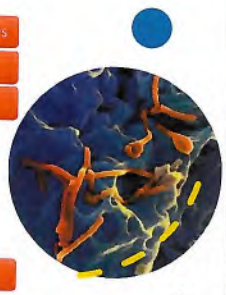
2007 WHO report: IDs emerging at unprecedented rates

Approx. 40 infectious diseases since 1970s

Rate of 1 or 2 per year

- SARS
- MERS
- Ebola
- Chikungunya
- Avian flu
- Swine flu
- Zika virus
- New coronavirus

>1100 epidemics in last 5 years.



Historical Epidemics and Pandemics

Epidemics in the 20th Century

Event	Date	Location	Disease	Death Toll
Influenza Pandemic (Spanish flu)	1918-1920	Worldwide	Influenza A virus, H1N1	50 million+
Influenza pandemic (Asian flu)	1957-58	Worldwide	Influenza A virus, H2N2	1–4 million
Hong Kong flu	1968-1970	Worldwide but mainly Hong Kong	Influenza A virus, H3N2	1–4 million
HIV/AIDS	1981 - Present	Worldwide	HIV/AIDS	32 million+(23.6–43.8 million)
BSE	1996-2001	UK	vCJD	178

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Epidemics in the 21st Century

Date	Disease	Location	Agent	Death Toll
2002-04	SARS	Worldwide	SARS-CoV	774
2003-19	Avian flu	Southeast Asia, Egypt	Influenza A virus, H5N1	455
2009-10	Swine flu	Worldwide	Influenza A virus, H1N1	151-575 K
2012-Present	MERS	Worldwide	MERS-CoV	935
2013-16	West African Ebola virus epidemic	Worldwide, Guinea, Liberia and Sierra Leone	Ebola virus	11K+
2019	**COVID-19**	**Worldwide**	**SARS-CoV-2**	**5.5M+**

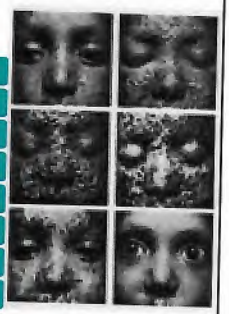
12

Smallpox

13

Smallpox

- Variola virus; member of the orthopoxvirus
- At least 3,000 years
- 30% case fatality rate
- 300M - 500M deaths in 20th century
- Respiratory droplet infection
- Fever, back pain, nausea, vomiting
- Vesicles ⇨ pustules ⇨ crust and fall off
- No known Rx



Smallpox

- **First vaccine developed against a contagious disease**
- 1967: WHO launched plan to eradicate
- 1980: **First infectious disease eradicated**
- Vaccine stockpile maintained by WHO in case of re-emergence

Plague

Plague

- Black Death: 14th century Europe; 50M deaths
- **Second highest infectious disease after Smallpox**
- Three (3) pandemics:
  - 6th century
  - Late middle ages
  - Mid-19th century
- Sporadic cases still occur
- Death rates: 30-90% (untreated); 10% (treated)
- Antibiotic Rx
- Three (3) types
  1. Bubonic
  2. Septicemic
  3. Pneumonic

Bubonic Plague

- Flea bites
- Symptoms
  - Fever
  - Headache
  - Malaise
  - Painful lymphadenopathy (bubo)

Septicemic Plague

- Transmission:
  - untreated insect bites
  - handling of infected animals with broken skin
- Symptoms and Signs
  - Similar to bubonic
    - Sometimes hemorrhage
    - Gangrene of distal tissues

Pneumonic Plague

- **Most virulent form but least common**
- Human to human droplet infection
- Rapidly progressive pneumonia → respiratory failure and shock

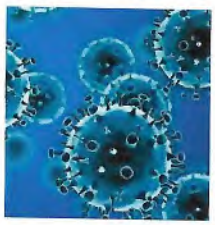
20

Influenza

21

Influenza

- Orthomyxovirus
- **Influenza A and B**
- Cause of seasonal flu (Oct to May)
- Some immunity from previous infections/vaccination
- Risk groups:
  - Infants
  - Elderly
  - Immunocompromised
  - Chronic illnesses



22

Influenza

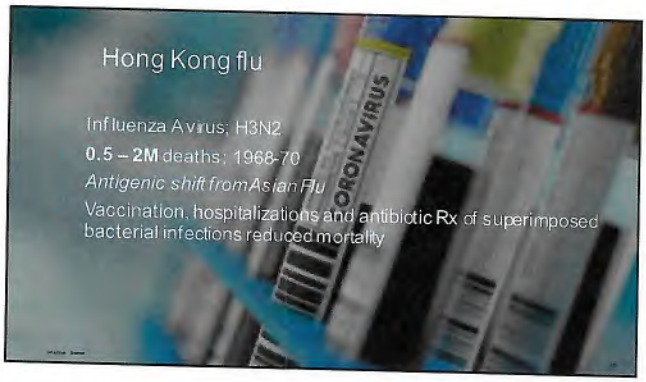
- Global outbreak of new strains of influenza A result in pandemics
- Little/no immunity from lack of prior exposure
- **Major public health threat**
- Three (3) strains in the 20th century
  - **Spanish flu** (1918-20)
  - **Asian flu** (1957-58)
  - **Hong Kong flu** (1968-70)
- One (1) strain in the 21st century
  - **Swine flu** (2009-10)

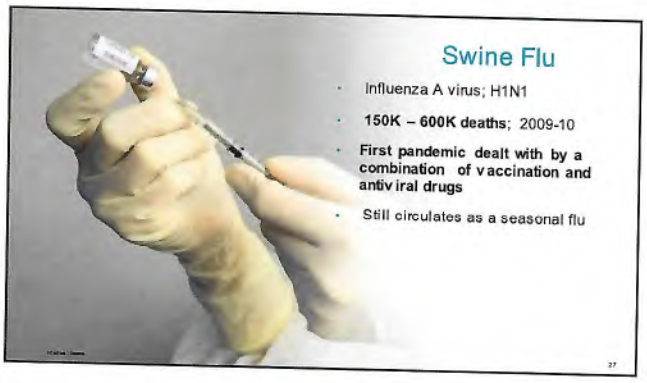
Spanish Flu

- Influenza A virus; H1N1
- **40-50M deaths**; 1918-1920
- Fatality due to combination of highly pathogenic strain + increase in travel due to WW1 + shortage of medical personnel (WW1) + unprepared global public health
- **Demonstrated the need for a robust public health system**

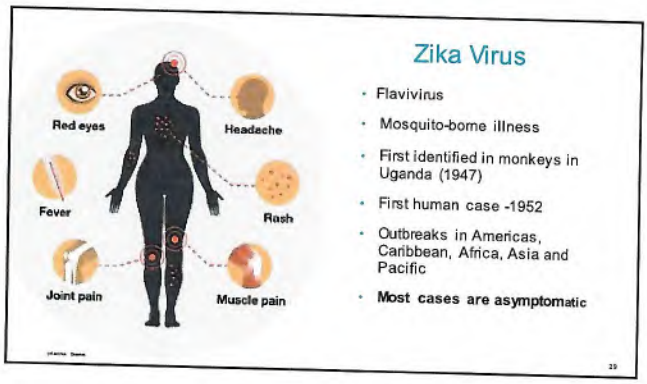
Asian Flu

- Influenza A virus; H2N2
- **1-2M deaths**; 1957-1958
- **First pandemic after establishment of global surveillance system**
- Vaccine campaign was attempted; only 13M doses given; efficacy of 53-60%


Hong Kong flu
Influenza A virus; H3N2
0.5 – 2M deaths; 1968-70
Antigenic shift from Asian Flu
Vaccination, hospitalizations and antibiotic Rx of superimposed bacterial infections reduced mortality
CORONAVIRUS


Swine Flu
Influenza A virus; H1N1
150K – 600K deaths; 2009-10
First pandemic dealt with by a combination of vaccination and antiviral drugs
Still circulates as a seasonal flu
27


Zika Virus
Infectious Diseases
28



Zika Virus

- Flavivirus
- Mosquito-borne illness
- First identified in monkeys in Uganda (1947)
- First human case -1952
- Outbreaks in Americas, Caribbean, Africa, Asia and Pacific
- **Most cases are asymptomatic**

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Zika Virus 2

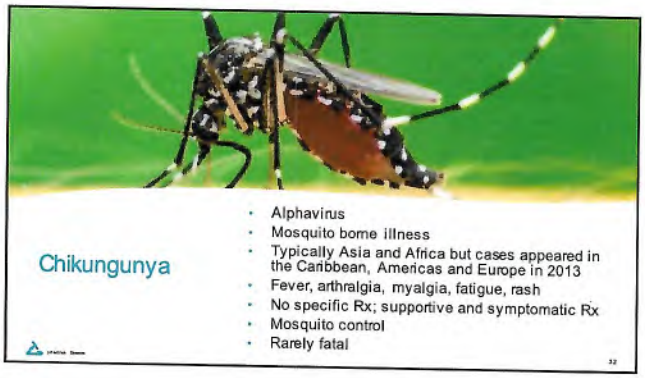
- Preterm birth and miscarriage
- **Congenital Zika Syndrome**
  - **microcephaly**
  - **other congenital anomalies**
- Increased risk of Guillain-Barre Syndrome, neuropathy and myelitis
- No specific treatment
- Mosquito control

30

Chikungunya

Infectious diseases

31



Chikungunya

- Alphavirus
- Mosquito borne illness
- Typically Asia and Africa but cases appeared in the Caribbean, Americas and Europe in 2013
- Fever, arthralgia, myalgia, fatigue, rash
- No specific Rx; supportive and symptomatic Rx
- Mosquito control
- Rarely fatal

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SARS

Infectious Diseases

33

SARS

- Severe Acute Respiratory Syndrome
- SARS-CoV; beta Coronavirus
- **First identified in China in2003**
- Droplet infection
- Spread to the Americas, Europe and Asia
- Unprecedented response halted spread
- **8K infections; 800 deaths**
- Last case was 2004 (lab acquired infection)

SARS 2

- Initial phase: fever, headache, malaise, myalgia
- After 2-3 days: cough, pneumonia, dyspnea, hypoxemia
- 10-20% of cases required intubation and mechanical ventilation
- Control measures: Same as COVID19
  - surveillance
  - quarantine
  - social distancing
  - masks
  - hand hygiene

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MERS

Infectious Diseases

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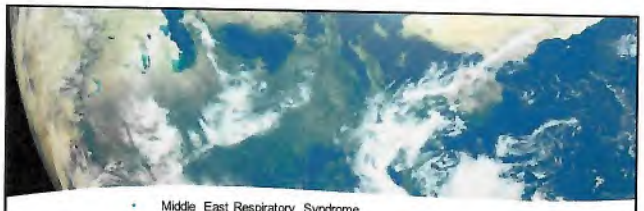


MERS

- Middle East Respiratory Syndrome
- MERS-CoV; beta Coronavirus
- Emerged in 2012 in Arabian Peninsula.
- Reported in 24 countries throughout Middle East, Europe, Asia, Africa, and North America
- 1000 cases; 400 deaths

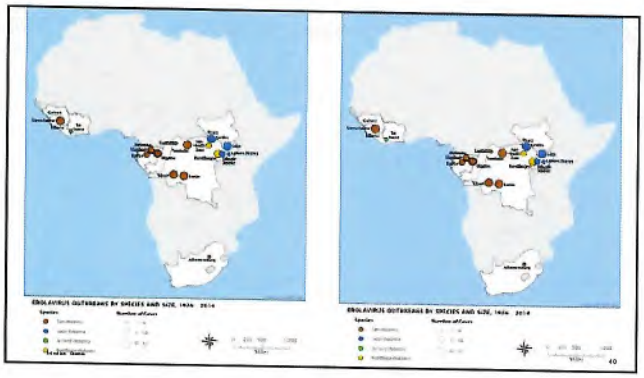
Infectious Diseases

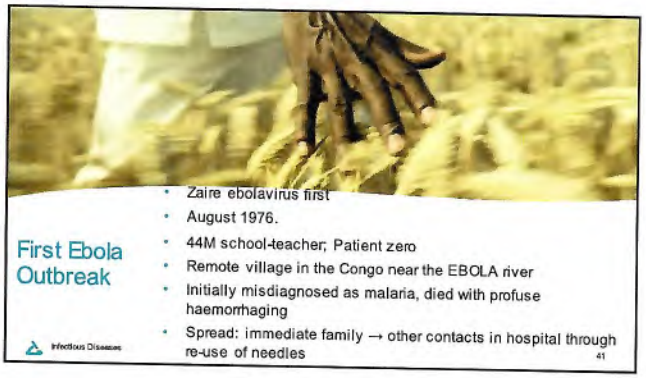
37

EBOLA

Ebola Virus

- Viral hemorrhagic fever
- ss enveloped RNA viruses; Filovirus family
- 2 genera: Marburg and EBOLA
- Five (5) EBOLA species:
  - **Zaire ebolavirus:**
  - ➢most common
  - ➢highest mortality rates (80%)
  - ➢1st recognized outbreak
  - Sudan ebolavirus: emerged in 1976, lower mortality (50-60%)
  - Reston ebolavirus: Endemic in Philippine animals, does not cause human disease
  - Cote d'Ivoire ebolavirus (Tai ebolovirus)
  - Bundibugyo ebolvairus





First Ebola Outbreak

- Zaire ebolavirus first
- August 1976.
- 44M school-teacher; Patient zero
- Remote village in the Congo near the EBOLA river
- Initially misdiagnosed as malaria, died with profuse haemorrhaging
- Spread: immediate family → other contacts in hospital through re-use of needles

Infectious Diseases

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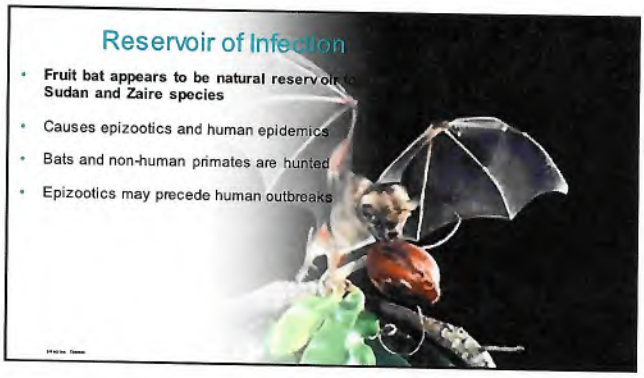
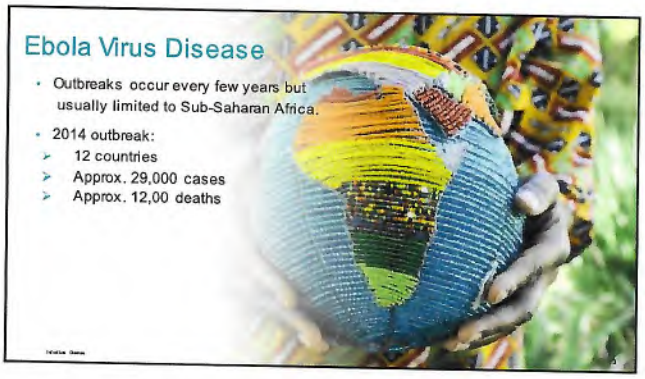
Reservoir of Infection

- **Fruit bat appears to be natural reservoir to Sudan and Zaire species**
- Causes epizootics and human epidemics
- Bats and non-human primates are hunted
- Epizootics may precede human outbreaks



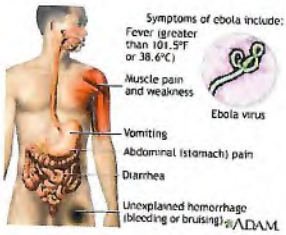
Ebola Virus Disease

- Outbreaks occur every few years but usually limited to Sub-Saharan Africa.
- 2014 outbreak:
  - 12 countries
  - Approx. 29,000 cases
  - Approx. 12,00 deaths



Ebola Virus Disease

- Spread:
  - contact with infected body fluids
  - infected animals (bats, porcupines, primates)
- **Similar presentation to Malaria and typhoid fever.**
- No proven treatments
- Fluid replacement
- Experimental vaccine (rVSV-ZEBOV) showed success in 2015
  - used in the DRC outbreak



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Novel Coronavirus

45

COVID-19

- **CO**rona**VI**rus **D**isease-2019
- Probably zoonotic viral respiratory disease from China
- Rapid spread led to global pandemic
  - International travel
  - Community spread
  - Vulnerable populations
- Respiratory disease
  - URTI progressing to ARDS
  - Resp failure + vent-dependency
  - Similar to SARS, MERS
- Vaccines developed; tablet for mild disease

SARS-CoV-2

- **Severe Acute Respiratory Disease Corona Virus 2**
- Cause of COVID-19 disease
- Novel coronavirus; RNA virus
- *"corona"* = sun-like spike proteins on surface
- Binds to ACE2 receptor on cells
  - type 2 pneumocytes in lungs

COVID-19 and Medicolegal Death Investigation

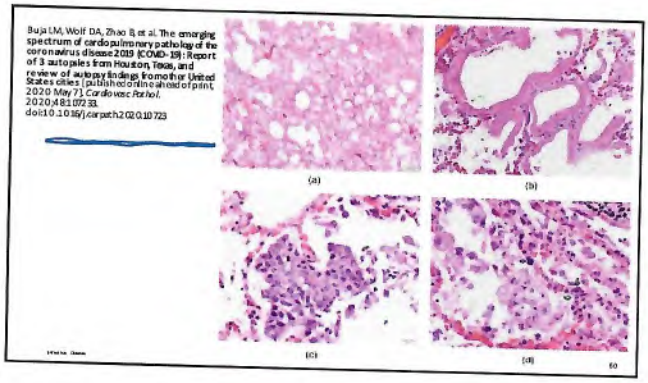
- Covid-19 disease was most urgent health emergency worldwide
- MLDI have to navigate this emergency without compromising standards whilst safeguarding the personal health and the criminal justice system
  - Quick adaption and readjustment of policies and procedures to respond adequately to the changes imposed by the pandemic
  - Workplace modifications
  - Slower pace of operations; increased cost of operations
  - Increase stress

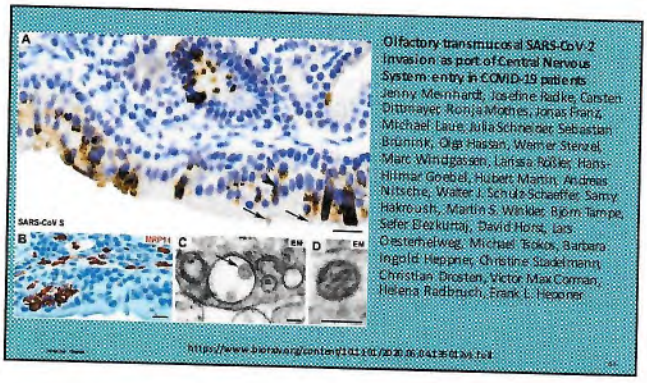
Infectious Diseases

Pathology

1. **Universal**
   - Diffuse alveolar damage/viral pneumonitis (similar to SARS)
2. **Novel observations**
   - Heart (myocarditis)
   - Brain
   - Vascular
   - Hypercoagulable state

Infectious Diseases


Buja LM, Wolf DA, Zhao B, et al. The emerging spectrum of cardiopulmonary pathology of the coronavirus disease 2019 (COVID-19): Report of 3 autopsies from Houston, Texas, and review of autopsy findings from other United States cities. J Publish ahead of print, 2020 May 7]. Cardiovasc Pathol. 2020;48:107233. doi:10.1016/j.carpath.2020.107233


A
SARS-CoV S
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Olfactory transmucosal SARS-CoV-2 invasion as port of Central Nervous System entry in COVID-19 patients.
Jenny Meinhardt, Josefine Radke, Carsten Dittmayer, Ronja Mothes, Jonas Franz, Michael Laue, Julia Schneider, Sebastian Brünink, Olga Hassan, Werner Stenzel, Marc Windgassen, Larissa Rößler, Hans-Hilmar Goebel, Hubert Martin, Andreas Nitsche, Walter J. Schulz-Schaeffer, Samy Hakroush, Martin S. Winkler, Björn Tampe, Sefer Bezkurtaj, David Horst, Lars Oesterhelweg, Michael Tsokos, Barbara Ingold-Heppner, Christine Stadelmann, Christian Drosten, Victor Max Corman, Helena Radbruch, Frank L. Heppner


Medicolegal Issues
Public Health
• Screening of deaths in community using postmortem nasopharyngeal swab
• Cases with unclear Cause of Death (competing causes of death)
Quality of Care in Long-Term Care facilities
• Allegations of neglect

Postmortem Considerations

1. **How long does the virus live in a dead body?**
   - Unknown, but no reason to believe that postmortem infectious risk is high
2. **Dead people cannot cough, sneeze or speak. Why is there a risk of contracting COVID-19 at autopsy?**
   - Aerosols can be generated during the postmortem examination
3. **Should autopsies be performed on COVID-19 positive cases?**
   - Under specific circumstances
   - Case-specific compelling medicolegal issue(s)
4. **How should autopsies be conducted?**
   - Depends on purpose: can be minimally-invasive approach
   - Negative pressure room & precautions of aerosolization (N95 mask)
5. **What is the current practice in Ontario?**
   - Only targeted examinations for medicolegal reasons only
6. **Burial or Cremation?**
   - Either is acceptable

63

Postmortem Precautions

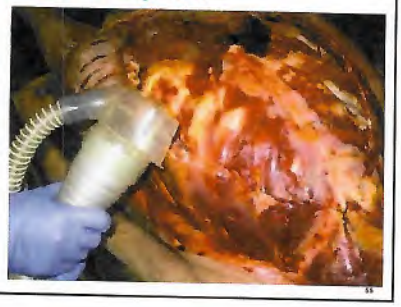
Reduction of the production of aerosols

- Use of rib shears to open rib cage
- Do not open head
- If head opening is indicated, use oscillating saw inside a sealed, large ziplock plastic bag

Instillation of formalin into lungs for fixation

- Examination of fixed lungs

Use of Oscillating Saw



Provincial Forensic Pathology Unit

Guidelines for Management of Fatal Suspected Coronavirus Disease 2019 (COVID-19) Cases

P-PRO-PFPU-34.01

34.1 PURPOSE

To provide direction to staff on the management of fatal suspected Coronavirus disease 2019.

External Examination-Only

- **No negative pressure room required**
- Routine PM safety practices
- Full-body PMCT (if available)
- Collection of 1 NPS* for submission
- Collection of 1 throat swab* for submission

*No induction of sneezing/coughing, aerolization of bodily fluids/tissues

Invasive Postmortem Examination

- **Negative pressure autopsy room**
- **Standard PPE**
  - scrubs, long sleeved, full resistant/impermeable surgical gown
  - waterproof apron
  - two (2) pairs of gloves
  - N95 face mask
  - face shield/goggle
- **Full body PMCT** *(if available)*
- ***Avoid aerosol-producing procedures!*** **eg use of oscillating *bone saw (OBS)***
  - Use vacuum shroud to contain aerosols if OBS must be used
- **Minimal number of personnel** (pathologist, dirty tech, clean tech)
- **Ordered removal of PPE after procedure** (gloves, goggles/face shield/gown/N95 mask)
- **Hand washing** (soap & water x 20 sec; alcohol-based sanitizer)

Post-Autopsy COVID-19 Considerations

- Normal reconstruction procedures of body (still in full PPE)
- Routine disinfection and cleaning procedures of autopsy suite
- Double bagging of body*
- Apply bio-hazard label of COVID-19 status (known or suspected) on outside of body bag and alert funeral home of risk
- Staff exposure: follow local Occupational Health guidelines

Body Transportation

- Inform funeral home of decedent's status
- Use of gloves to handle body
- Routine transportation procedures

Summary

- We live in an unprecedented time.
- Despite the advances of modern medicine, the world population is constantly under the threat of new and re-emerging infectious diseases and this is concerning.
- COVID-19 pandemic has radically changed our way of life.
- What other infectious disease will follow COVID-19?
- Medicine and Science have to be concerned and vigilant.

Acknowledgements

- Staff of the Eastern Ontario Regional Forensic Pathology Unit.
- Dr Anton Small, Resident in Anatomical Pathology
  University Hospital of the West Indies, UWI Mona, Jamaica
- Dr Roque Blanco, Medical Examiner, Belize national Forensic Science Service
- Dr Michael Pollanen, Chief Forensic Pathologist of the Ontario Forensic Pathology Service

Infectious Diseases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(cewalker@eorla.ca)

Fatal Vertebral Artery Dissection Following Self-Manipulation of the Cervical Spine

Jane E. Persons, MD, PhD
Pathology Resident, PGY3
University of Iowa Hospitals and Clinics

1

Case History

- 40-year-old man with no significant past medical history
- 'Cracked his neck' while at work
- Soon after, developed neck pain and stroke-like symptoms, then became unresponsive
- Entire event was witnessed by coworkers

2

Case History

- Imaging showed bilateral vertebral artery dissections and right-sided acute infarcts of the cerebellum, pons, and medulla with associated edema, tonsillar herniation and brainstem compression
- Neurological status continued to decline and brain death was pronounced several days later

3

Anatomy Review

4

Vertebral Arteries: Course

- Preforaminal (V1) segment arises from the subclavian arteries and enters the transverse foramen of C6 (90%)
- Foraminal (V2) segment ascends along the cervical vertebrae within the transverse foramina to C2
- Extradural/atlantic (V3) segment extends from transverse foramen of C2 to the vertebral canal

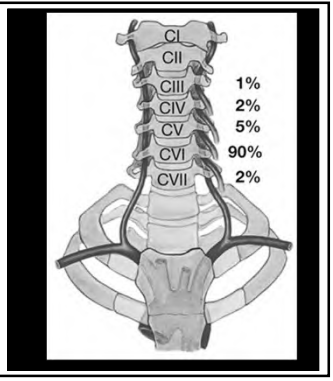

Image source: Hombach-Klonisch et al. *Sobotta Clinical Atlas of Human Anatomy.*

5

Vertebral Arteries: Course

Intradural/Intracranial (V4) segment pierces the dura and enter the vertebral canal, then passes through the foramen magnum into the posterior fossa

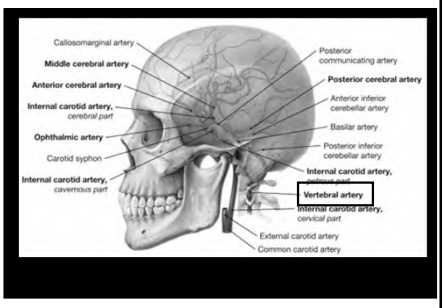

Image source: Hombach-Klonisch et al. *Sobotta Clinical Atlas of Human Anatomy.*

6

Vertebral Arteries: Course

- V4 then ascends along the ventrolateral medulla to converge at the pontomedullary junction to form the basilar artery
- Vertebrobasilar system irrigates cerebellum, pons, medulla, and portions of the spinal cord

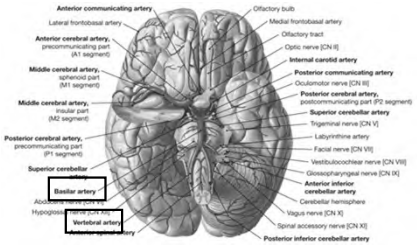

Image source: Hombach-Klonisch et al. *Sobotta Clinical Atlas of Human Anatomy.*

7

Autopsy Examination

8

- A posterior approach was used to expose and visualize the vertebral arteries, beginning with an I-shaped incision
- The soft tissue was next dissected to expose the spinous processes of the cervical vertebrae
- Once exposed, the transverse foramina were unroofed to expose and visualize the vertebral arteries
- The brain was removed using a posterior approach to allow the vertebrobasilar system to be removed as a unit

9

- The right vertebral artery showed grossly visible hemorrhage and dilation beginning at the V3 segment and extending up into the V4 segment
- The left vertebral artery showed grossly visible hemorrhage in the V2 segment in the region of the third and fourth cervical vertebrae
- Microscopic examination of the right vertebral artery showed a large dissection tract in the V3 segment with disruption of the elastic laminae
- The left vertebral artery showed patchy areas of intramural dissecting hemorrhage

10

Injury Mechanism

11

Injury Mechanism

- Decedent was witnessed to 'crack his neck' by placing a hand on his chin and using it to turn/twist his head (forced rotational motion)
- Rotation of the head occurs at the atlanto-axial joint

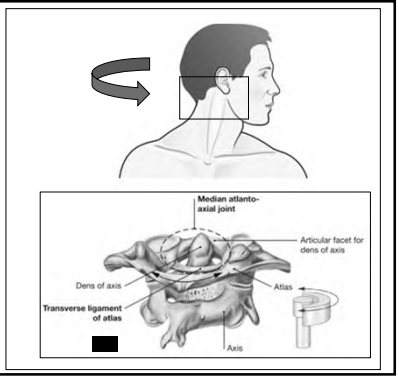

Image adapted from:
Hombach-Klonisch et al. *Sobotta Clinical Atlas of Human Anatomy.*

12

Injury Mechanism

- V3 segment overlies the atlanto-axial joint
- V3 is relatively mobile and courses between two fixed segments, and therefore vulnerable to stretching and compression of the vessel against the cervical vertebrae, which can cause the intima to tear

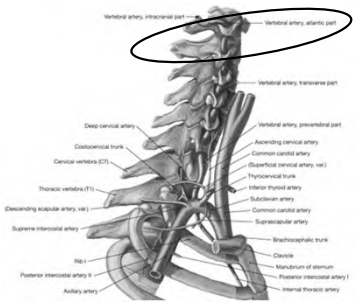

Image adapted from:
Hombach-Klonisch et al. *Sobotta Clinical Atlas of Human Anatomy.*

13

Summary and Case Resolution

- Fatal vertebral artery dissection sustained as the result of a self-performed twisting force applied to the neck
- Highlights the importance of comprehensive history – investigation identified a compelling (and witnessed!) source of traumatic injury
- Vertebral artery dissection can be traumatic or spontaneous
  - Trauma accounts for ~40% of vertebral artery dissections, up to 90% of which occur in the setting of minor trauma
  - The V3 segment is the most common location for vertebral artery dissection, and often occurs bilaterally
- Cause of Death: Complications of cerebellar and brainstem infarcts due to bilateral vertebral artery dissections due to blunt force injuries of the neck sustained as the result of self neck manipulation
- Manner of Death: Accident

14

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15

Domestic Violence-Related Deaths of Women in Eastern North Carolina: A 10-year Retrospective Study.

Felisha Davis, MD PGY3
2023 NAME National Meeting
October 14, 2023

Acknowledgment: Dr. Karen Kelly and Miranda Oliver.

1

Objectives

- Review of domestic violence
- Statistics of domestic violence in the United States and North Carolina
- Overview of Eastern North Carolina
- Review statistics of domestic violence-related deaths of women from the Eastern Regional Autopsy Center covering 28 counties in Eastern North Carolina

2

Domestic Violence(DV)

- Abuse (emotional, sexual, or physical) that is inflicted on another person (male or female) by a significant other or family member.
- Encompasses intimate partner violence, elder abuse, and child abuse.

3

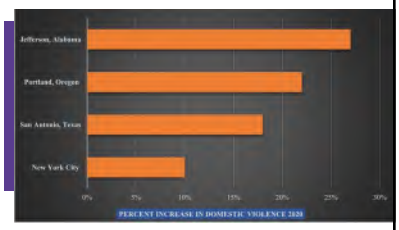
Statistics and Demographics of DV

- Effects greater than 10 million people a year in the United States.
- DV has been shown to increase during times of stressful situations.

4

COVID-19 Effects on DV

- Shelter-in-place orders forced victims of domestic violence to stay home.
  - No privacy.
  - No means of escape.
- Increase psychological and economic stress on individuals and families.



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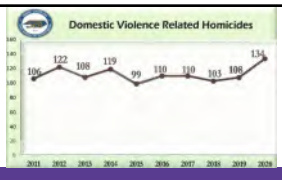
- From 2019 to 2020 :
  - North Carolina showed a 24.1 % increase in DV-related homicides.

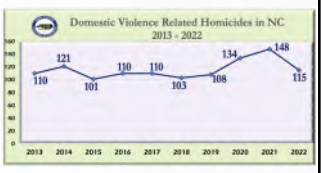


- From 2020 to 2021 :
  - North Carolina showed a continued increase in DV-related homicides (10.4%).

6

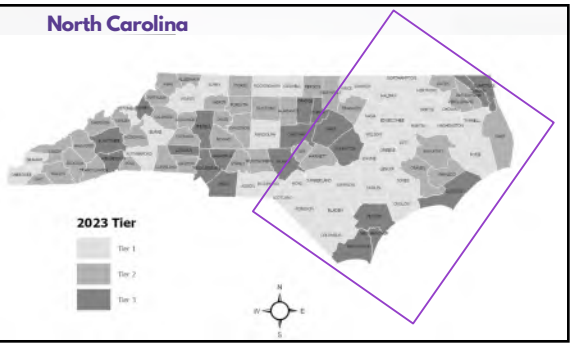
DV Statistics in North Carolina

- From 2021 to 2022:
  - North Carolina showed an 18.1 % decrease in DV-related homicides.



7

North Carolina



8

Eastern Regional Autopsy Center

- Covers 28 out of 41 counties in eastern North Carolina.
- 18 of the 28 counties are considered a tier 1.

9

Methods

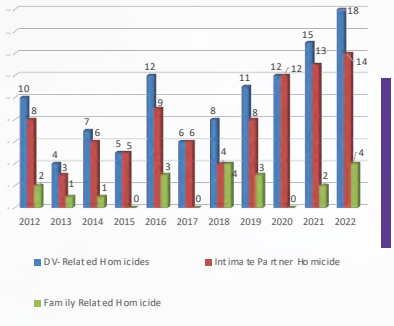
- The records of the Eastern Regional Autopsy Center database was used to review female homicides from 2012 to 2022 in Eastern North Carolina.
- DV-related homicides inclusion criteria:
  - greater than 15 years old
  - The perpetrator was a significant other, a family member, or a bystander in the DV situation.
- Demographics, cause of death, weapon type, and perpetrator were recorded.

10

Methods cont.

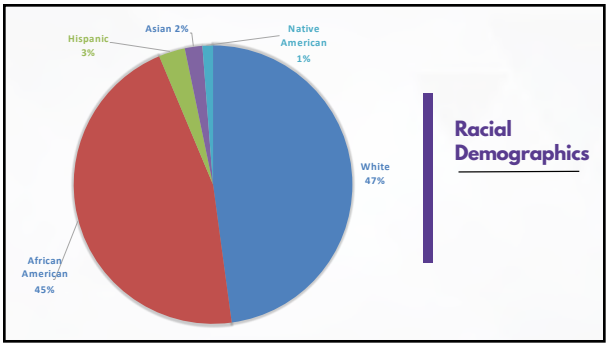
- Female homicides classified into two groups
  - DV-related homicides
  - Other homicides
- DV-related homicides were reclassified into two groups
  - Intimate partner homicide
    - Female killed by significant other, lover, or bystander in the DV situation.
  - Family-related homicide
    - Female killed by a family member or bystander in the DV situation.

11

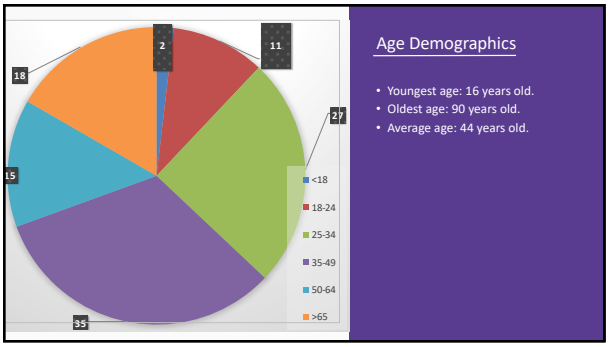


DV-Related Homicides 2012-2022

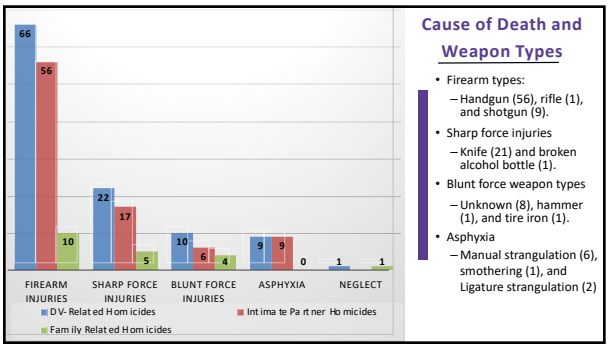
12


Hispanic 3%
Asian 2%
Native American 1%
White 47%
African American 45%
Racial Demographics

13


2
11
18
27
15
35
<18
18-24
25-34
35-49
50-64
>65
Age Demographics
• Youngest age: 16 years old.
• Oldest age: 90 years old.
• Average age: 44 years old.

14


66
56
10
22
17
5
10
6
4
9
9
0
1
1
FIREARM INJURIES
SHARP FORCE INJURIES
BLUNT FORCE INJURIES
ASPHYXIA
NEGLECT
DV-Related Homicides
Intimate Partner Homicides
Family Related Homicides
Cause of Death and Weapon Types
• Firearm types:
– Handgun (56), rifle (1), and shotgun (9).
• Sharp force injuries
– Knife (21) and broken alcohol bottle (1).
• Blunt force weapon types
– Unknown (8), hammer (1), and tire iron (1).
• Asphyxia
– Manual strangulation (6), smothering (1), and Ligature strangulation (2)

15

Additional Findings

- 4 cases involved women that were pregnant at the time of their death.
  - —All the cases were intimate partner homicide.
- 22 case involved DV-related deaths followed by perpetrator suicide.
  - —All the cases were intimate partner homicide.
- 3 case were classified as mercy killing by the perpetrator.
  - —All the cases were intimate partner homicide.

16

Conclusion

- COVID-19 brought about many repercussions around the world, including increases in violence, like DV
- Our study aligns with the current literature on increased DV during COVID-19.
- Highlights the continued increase of DV following COVID-19 in eastern North Carolina.
  - —Increased economic uncertainty and mental health problems in the region.
- Raise awareness for continued funding and support for individuals effected by DV.

17

THANK YOU

18

Resources

- Kourti, A., Stavridou, A., Panagouli, E., Psaltopoulou, T., Spiliopoulou, C., Tsolia, M., Sergentanis, T. N., & Tsitsika, A. Domestic Violence During the COVID-19 Pandemic: A Systematic Review. *Trauma, Violence, & Abuse*, *24*(2), 719–745 (2023). https://doi.org/10.1177/15248380211038690
- Evans, D, Hawk, S., and Ripkey, C. Domestic Violence in Atlanta, Georgia Before and During COVID-19. *Violence and Gender* 8:3, 140-147(2021). https://www.liebertpub.com/doi/full/10.1089/vio.2020.0061
- United Nations. (2020). Addressing the impact of the COVID-19 pandemic on violence against women and girls. Accessed September 19, 2023, from https://www.un.org/en/addressing-impact-covid-19-pandemic-violence-against-women-and-girls
- Byard, R.W. Geographic variability in homicide rates following the COVID-19 pandemic. *Forensic Sci Med Pathol* **17**, 419–421 (2021). https://doi.org/10.1007/s12024-021-00370-4

19

Resources

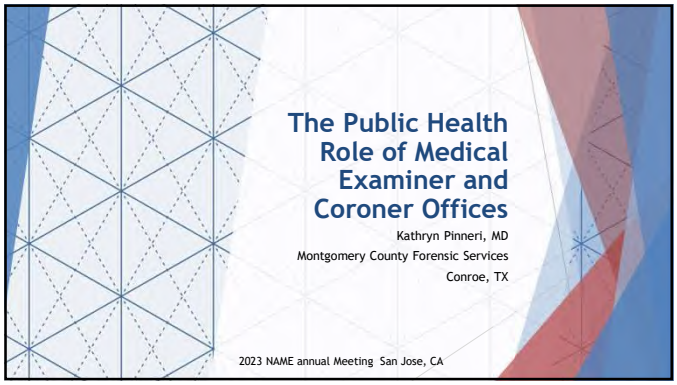
- Boserup B, McKenney M, Elkbuli A. Alarming trends in US domestic violence during the COVID-19 pandemic. Am J Emerg Med. 38(12):2753-2755 (2020).
- Huecker MR, King KC, Jordan GA, et al. Domestic Violence. [Updated 2023 Apr 9]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499891/
- North Carolina Department of Public Safety. (2020). Report on Domestic Violence Relaed Homicides for Calender Year 2020 Reporting Requirements and Implementation. Accessed September 26, 2023, from https://www.ncsbi.gov/Services/SBI-Statistics/Domestic-Violence-Report/2020-DV-Homicide-Report-March-2021.aspx

20

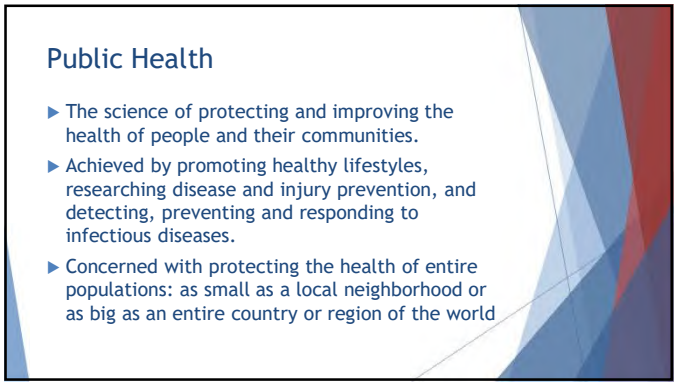
Resources

- North Carolina Department of Public Safety. (2021). Report on Domestic Violence Relaed Homicides for Calender Year 2021 Reporting Requirements and Implementation. Accessed September 26, 2023, from https://www.ncsbi.gov/Services/SBI-Statistics/Domestic-Violence-Report/2021-DV-Homicides-Report-March-2022.aspx
- North Carolina Department of Commerce. (2023). 2023 North Carolina Development Tier Designation. Accessed Sept 26, 2023, from https://www.commerce.nc.gov/report-county-tiers-ranking-memo-current-year/download?attachment
- North Carolina Department of Public Safety. (2022). Report on Domestic Violence Relaed Homicides for Calender Year 2020 Reporting Requirements and Implementation. Accessed September 26, 2023, from https://www.ncsbi.gov/Services/Crime-Statistics/Domestic-Violence-Report/2022-DV-Homicides-Report-March-2023.aspx.
- Boserup B, McKenney M, Elkbuli A. Alarming trends in US domestic violence during the COVID-19 pandemic. Am J Emerg Med. 2020 Dec;38(12):2753-2755. doi: 10.1016/j.ajem.2020.04.077. Epub 2020 Apr 28. PMID: 32402499; PMCID: PMC7195322.

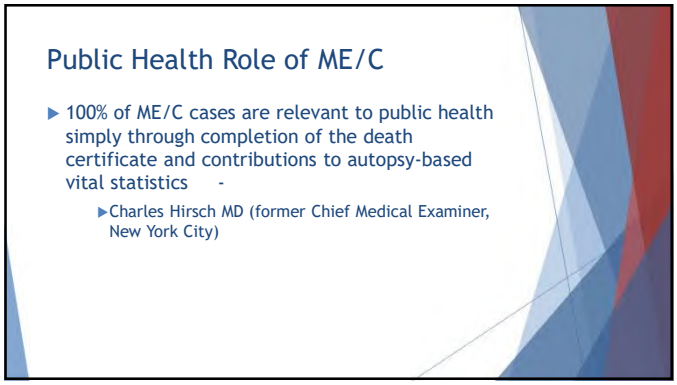
21


The Public Health Role of Medical Examiner and Coroner Offices
Kathryn Pinneri, MD
Montgomery County Forensic Services
Conroe, TX
2023 NAME annual Meeting San Jose, CA

1


Public Health
The science of protecting and improving the health of people and their communities.
Achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases.
Concerned with protecting the health of entire populations: as small as a local neighborhood or as big as an entire country or region of the world

2


Public Health Role of ME/C
100% of ME/C cases are relevant to public health simply through completion of the death certificate and contributions to autopsy-based vital statistics -
Charles Hirsch MD (former Chief Medical Examiner, New York City)

3

Public Health Roles of ME/C Offices

- Child fatalities
- Infectious disease surveillance
- Suicides
- Homicides
- Drug related deaths
- Drownings
- Molecular/genetic testing
- QA for medical care: paramedics, hospitals, physicians
- Transportation fatalities
- Workplace safety
- Maternal deaths
- Multiple fatality events
- Natural disasters
- Product safety
- Elder abuse
- Fall related deaths
- ETC, ETC….

4

Public Health Roles of ME/C Offices

- Provide important data for public health surveillance
- Ability to detect clusters and unusual deaths
- Identify hazards and risk factors for development of preventive measures
  - Back-up cameras
  - Back-seat alert systems
  - New football helmet designs
  - Swimming pool alarms
  - Changing infant sleep environment
  - Safety warnings/product recalls

5

Public Health Roles of ME/C Offices

- Fentanyl related deaths
  - Hospital staff not aware that fentanyl doesn't show up on their regular urine drug screens
  - Multiple deaths with negative hospital UDS or benzodiazepines only
    - Administered fentanyl during resuscitation or hospitalization
  - Inconclusive toxicology
- Contacted EMS and Emergency Department Directors
  - Fentanyl UDS testing kits purchased and in use in several hospitals as of October 4

6

Death Certification

- Most information is initially mined from death certificates
  - National Vital Statistics System
    - Analyzes ~2.8 million records each year to produce timely and accurate information on death and its causes in the United States.
- Comes from a multitude of systems across the US
- Data modernization
  - Hope to put less burden on data providers
  - Provide and analyze data more 'real-time'
  - Interoperability of systems

7

Data Modernization

- Need to make data sharing easier
  - Electronic case management systems
  - Electronic death registration systems
  - Toxicology labs
  - Data requestors
    - NVDRS
    - Drug overdose surveillance (SUDORS)
    - Suicide surveillance
    - State and local public health agencies
    - Etc, etc, etc…..
- CDC Foundation grant (Fast Healthcare Interoperability Resources (FHIR))
  - Improve data exchange between ME/C and other agencies

8

Medicolegal Death Investigation

- Reports contain extremely valuable and important information
- Every data point is important to someone or some group
- The most comprehensive collection of data available
  - "Data goldmine"
- Need to make it accessible and searchable

9

Medicolegal Death Investigations

- Need to evolve with recent trends
- Ask questions pertinent to current problems
- Suicides:
  - Sexual orientation and gender identity
  - Social media/cyberbullying
  - Access to mental health services
- Pandemic: recent illnesses, sick contacts, recent travel
- Ensure race/ethnicity are recorded correctly

10

National Violent Death Reporting System (NVDRS)

- State-based surveillance (reporting) system that pools **more than 600 unique data elements** from multiple sources into an anonymous database.
  - Death certificates, coroner/medical examiner reports, law enforcement reports, and toxicology reports
- Provides valuable context about violent deaths: relationship problems; mental health conditions and treatment; substance abuse; and life stressors, including recent money, work, legal or physical health problems.

11

Reaching National Surveillance

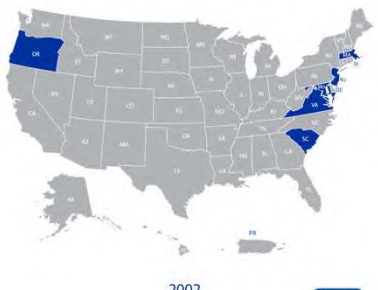
2000: National Violent Injury Statistics System (NVISS) piloted at 12 sites, mostly universities

2000: CDC starts planning

2002: First appropriation from Congress

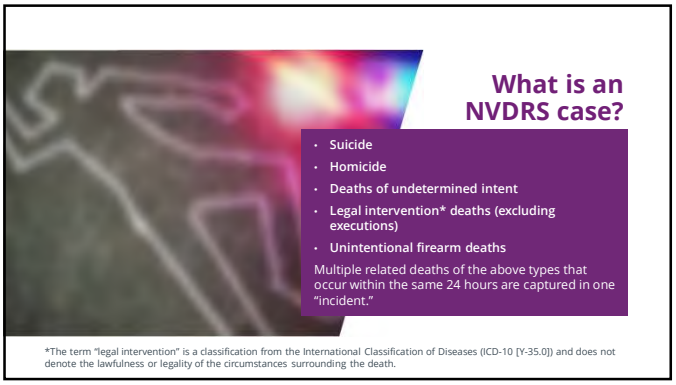
2003: Data collection begins with six states

2004-18: More states added (now all 50 states, DC, PR)

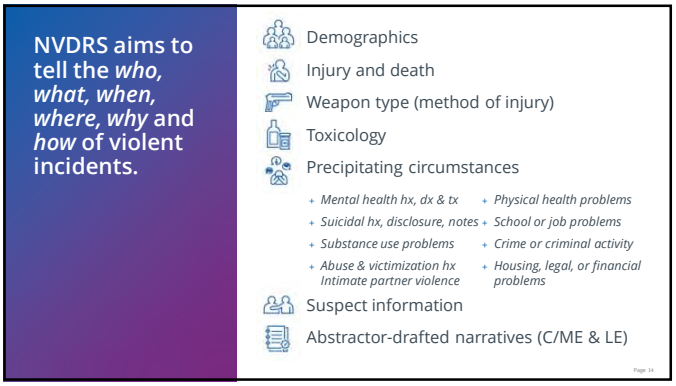


2002

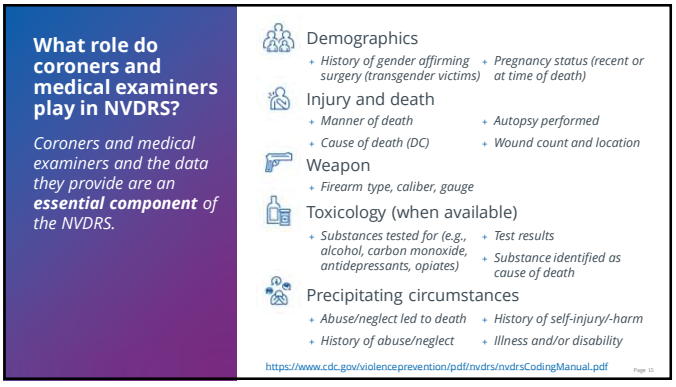
12


What is an NVDRS case?
Suicide
Homicide
Deaths of undetermined intent
Legal intervention* deaths (excluding executions)
Unintentional firearm deaths
Multiple related deaths of the above types that occur within the same 24 hours are captured in one "incident."
*The term "legal intervention" is a classification from the International Classification of Diseases (ICD-10 [Y-35.0]) and does not denote the lawfulness or legality of the circumstances surrounding the death.

13

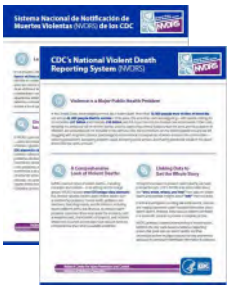

NVDRS aims to tell the *who, what, when, where, why* and *how* of violent incidents.
Demographics
Injury and death
Weapon type (method of injury)
Toxicology
Precipitating circumstances
Mental health hx, dx & tx
Suicidal hx, disclosure, notes
Substance use problems
Abuse & victimization hx Intimate partner violence
Physical health problems
School or job problems
Crime or criminal activity
Housing, legal, or financial problems
Suspect information
Abstractor-drafted narratives (C/ME & LE)

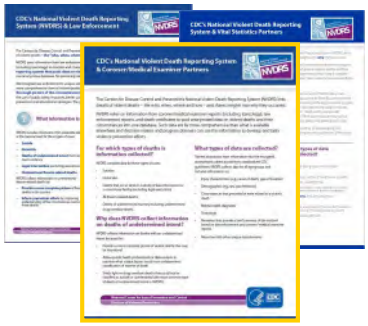
14


What role do coroners and medical examiners play in NVDRS?
*Coroners and medical examiners and the data they provide are an **essential component** of the NVDRS.*
Demographics
History of gender affirming surgery (transgender victims)
Pregnancy status (recent or at time of death)
Injury and death
Manner of death
Cause of death (DC)
Autopsy performed
Wound count and location
Weapon
Firearm type, caliber, gauge
Toxicology (when available)
Substances tested for (e.g., alcohol, carbon monoxide, antidepressants, opiates)
Test results
Substance identified as cause of death
Precipitating circumstances
Abuse/neglect led to death
History of abuse/neglect
History of self-injury/-harm
Illness and/or disability
https://www.cdc.gov/violenceprevention/pdf/nvdrs/nvdrsCodingManual.pdf

15

NVDRS Fact Sheets





https://www.cdc.gov/violenceprevention/pdf/NVDRS-coroner-medicalexaminer-factsheet-508.pdf

16

Annual summary of NVDRS data

Surveillance for Violent Deaths — National Violent Death Reporting System, 48 States, the District of Columbia, and Puerto Rico, 2020

Comprehensive look at victim and incident characteristics and circumstances

Examples of how states have used their VDRS data to guide public health action

Used to respond to inquiries

http://dx.doi.org/10.15585/mmwr.ss7205a1

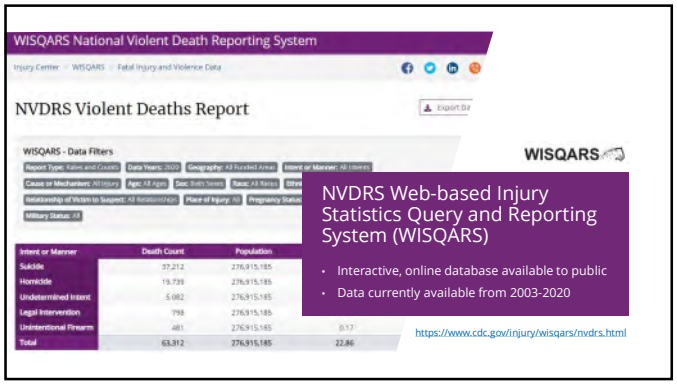
17

Using NVDRS to respond to timely topics

Previously published analyses

- Suicide among incarcerated persons
- Child abuse-related homicides precipitated by caregiver use of harsh physical punishment
- Trends in homicide of children aged 0 to 17 years
- Deaths due to lethal force by law enforcement
- Homicides of American Indians/Alaska Natives
- Suicide rates by industry and occupation
- Suicides among lesbian and gay male individuals
- Differences between mass, multiple, and single-victim homicides
- Suicide among males across the lifespan
- Racial and ethnic differences in homicide of women and the role of intimate partner violence

18



19

NVDRS Restricted Access Database (RAD)

NVDRS data are also made available to external researchers.

- De-identified, multi-state/-jurisdiction, case-level data set
- Available to researchers who meet certain eligibility criteria
- Project proposals reviewed by CDC NVDRS science officers and information technology (IT) expert
- Further review on an ad hoc basis

20

SUMMARY

- Every death investigated by ME/C offices plays a role in public health
- Every data point collected is important
- Interoperability of computer systems will improve data exchange
- Many current safety measures came from our data
- We are making a difference

▶KEEP UP THE GREAT WORK!!!

21

INTERDISCIPLINARY EDUCATION IN FORENSIC PATHOLOGY

A COLLABORATIVE APPROACH TO ADDRESSING THE PHYSICIAN WORKFORCE SHORTAGE

Jenna Aungst, OMS-II,[1] Gail Parker,[2] Mark Giffen, MD,[3] Adam Kolatorowicz, PhD,[4] Juniper Fedor, PA (ASCP)CM, D-ABMDI,[5] M.J. Menendez, JD,[3] Gerald Gowitt, MD,[3] Lauren Bucci, MBMS,[1] Marquel Johnson,[1] Julio Alicea,[1] Crystal Lee, MPH,[1] James Gill, MD[6]

[1]Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Knoxville, TN, USA
[2]DeKalb County Medical Examiner's Office, Decatur, GA, USA
[3]Georgia State University, School of Public Health, Atlanta, GA, USA
[4]Wake Forest School of Medicine, Winston-Salem, NC, USA
[5]Center for Forensic Science Research & Education, Willow Grove, PA, USA
[6]Connecticut Office of Chief Medical Examiner, Farmington, CT, USA

1

WORKFORCE CAPACITY

IN FORENSIC PATHOLOGY

750
FULL-TIME, PRACTICING, BOARD-CERTIFIED FORENSIC PATHOLOGISTS IN THE U.S.

38%

CURRENT WORKFORCE

MINIMUM REQUIREMET

1,552
Forensic pathologists required to meet minimum U.S. autopsy requirement

> 2,000
Forensic pathologist required to meet minimum U.S. autopsy requirement
+
education, consultation, military, and public health needs

MINIMUM REQUIREMENT + ADDITIONAL NEEDS

2

STUDY AIMS

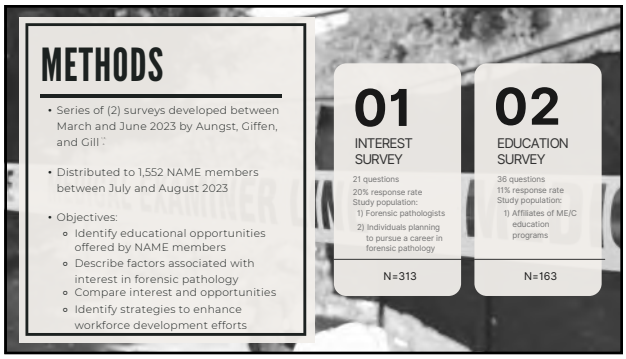
WORKFORCE DEVELOPMENT

2022 - 2030 NAME STRATEGIC PLAN

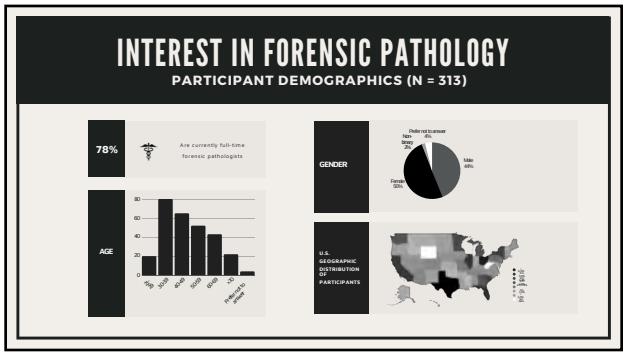
Goal #1: Remediate the forensic pathology workforce shortage through elevation and escalation of the "all-hands-on deck" focus, strategies, and work throughout the entirety of the NAME organization.

- Identify national trends in forensic pathology education
- Analyze prospective student interest factors
- Model evolution of ME/C education programs
- Discuss benefits of an interdisciplinary program model

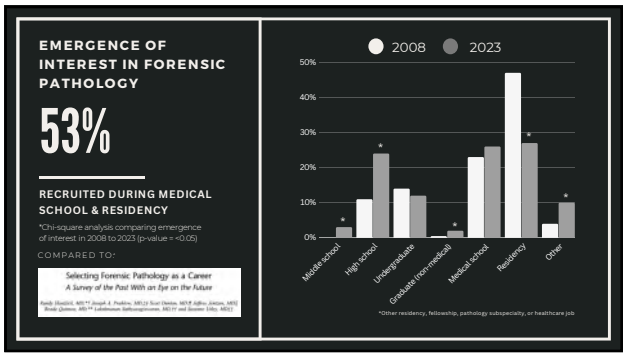
3


METHODS
• Series of (2) surveys developed between March and June 2023 by Aungst, Giffen, and Gill
• Distributed to 1,552 NAME members between July and August 2023
• Objectives:
◦ Identify educational opportunities offered by NAME members
◦ Describe factors associated with interest in forensic pathology
◦ Compare interest and opportunities
◦ Identify strategies to enhance workforce development efforts
01
INTEREST SURVEY
21 questions
20% response rate
Study population:
1) Forensic pathologists
2) Individuals planning to pursue a career in forensic pathology
N=313
02
EDUCATION SURVEY
36 questions
11% response rate
Study population:
1) Affiliates of ME/C education programs
N=163

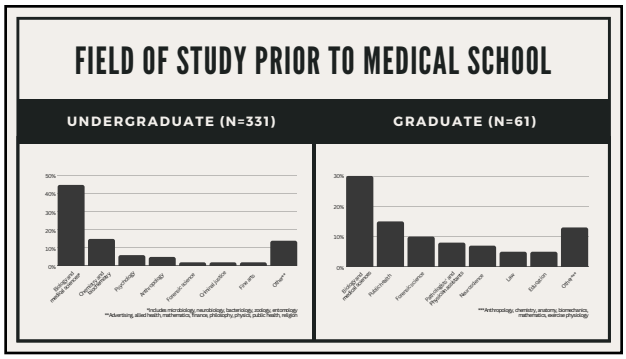
4


INTEREST IN FORENSIC PATHOLOGY
PARTICIPANT DEMOGRAPHICS (N = 313)
78%
Are currently full-time forensic pathologists
AGE
GENDER
U.S. GEOGRAPHIC DISTRIBUTION OF PASTICIPANTS

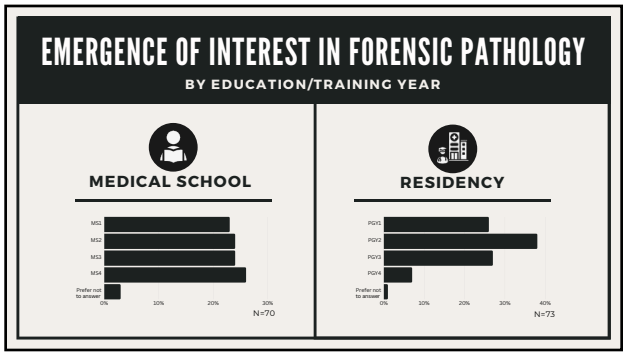
5


EMERGENCE OF INTEREST IN FORENSIC PATHOLOGY
53%
RECRUITED DURING MEDICAL SCHOOL & RESIDENCY
*Chi-square analysis comparing emergence of interest in 2008 to 2023 (p-value = <0.05)
COMPARED TO:
Selecting Forensic Pathology as a Career
A Survey of the Past With an Eye on the Future
2008
2023
50%
40%
30%
20%
10%
0%
Middle school
High school
Undergraduate
Graduate (non-medical)
Medical school
Residency
Other
*Other residency, fellowship, pathology subspecialty, or healthcare job

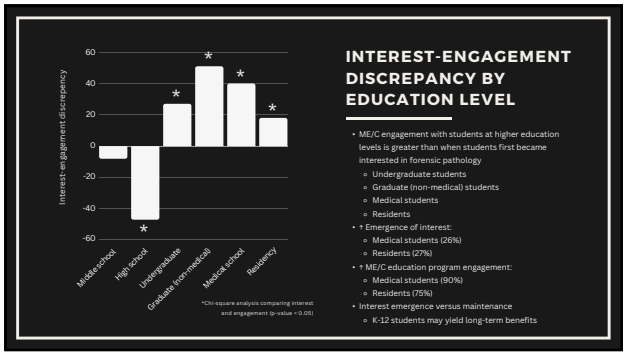
6


FIELD OF STUDY PRIOR TO MEDICAL SCHOOL
UNDERGRADUATE (N=331)
GRADUATE (N=61)
50%
40%
30%
20%
10%
0%
Biological, medical, and chemical sciences
Chemistry and biochemistry
Psychology
Anthropology
Forensic science
Criminal justice
Fine arts
Other*
*Includes microbiology, neurobiology, bacteriology, zoology, entomology
**Advertising, allied health, mathematics, finance, philosophy, physics, public health, religion
30%
20%
10%
0%
Biological, medical, and chemical sciences
Kinesiology
Forensic science
Psychology and Physical Sciences
Neuroscience
Law
Education
Other**
***Anthropology, chemistry, anatomy, biomechanics, mathematics, exercise physiology

7


EMERGENCE OF INTEREST IN FORENSIC PATHOLOGY
BY EDUCATION/TRAINING YEAR
MEDICAL SCHOOL
MS1
MS2
MS3
MS4
Prefer not to answer
0%
10%
20%
30%
N=70
RESIDENCY
PGY1
PGY2
PGY3
PGY4
Prefer not to answer
0%
10%
20%
30%
40%
N=73

8

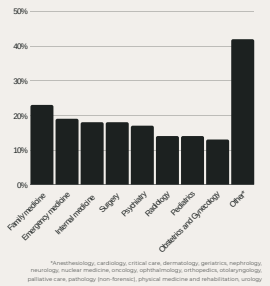

Interest-engagement discrepancy
60
40
20
0
-20
-40
-60
Middle school
High school
Undergraduate
Graduate (non-medical)
Medical school
Residency
*Chi-square analysis comparing interest and engagement (p-value < 0.05)
INTEREST-ENGAGEMENT DISCREPANCY BY EDUCATION LEVEL
• ME/C engagement with students at higher education levels is greater than when students first became interested in forensic pathology
◦ Undergraduate students
◦ Graduate (non-medical) students
◦ Medical students
◦ Residents
• † Emergence of interest:
◦ Medical students (26%)
◦ Residents (27%)
• † ME/C education program engagement:
◦ Medical students (90%)
◦ Residents (75%)
• Interest emergence versus maintenance
◦ K-12 students may yield long-term benefits

9

SPECIALTIES CONSIDERED

DURING EDUCATION & TRAINING (N=258)

- Mean number of specialties considered = 1.9 (*SD* = 1.5)
- Student organization outreach
  - 43% participated in a Pathology Student Interest Group
- Medical student elective rotations
- Interdisciplinary lecture topics



*Anesthesiology, cardiology, critical care, dermatology, geriatrics, nephrology, neurology, nuclear medicine, oncology, ophthalmology, orthopedics, otolaryngology, palliative care, pathology (non-forensic), physical medicine and rehabilitation, urology

10

FACTORS INFLUENCING INTEREST IN FORENSIC PATHOLOGY

*Rotation during other education level, family influence, life experiences, search engine, newspaper

11

PERCEPTIONS IN FORENSIC PATHOLOGY

I CONSIDER FORENSIC PATHOLOGY TO BE AN INTELLECTUALLY CHALLENGING SPECIALTY.

94%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

I CONSIDER FORENSIC PATHOLOGY TO BE AN EXCITING AND REWARDING SPECIALTY.

90%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

I AM SATISFIED WITH MY DECISION TO PURSUE A CAREER IN FORENSIC PATHOLOGY.

89%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

I AM SATISFIED WITH MY LIFESTYLE IN FORENSIC PATHOLOGY.

83%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

I HAVE SUFFICIENT OPPORTUNITIES FOR SOCIAL INTERACTION IN FORENSIC PATHOLOGY.

77%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

I AM SATISFIED WITH MY INCOME IN FORENSIC PATHOLOGY.

72%

of participants **strongly agreed**, **agreed**, or **somewhat agreed**.

*N=216

12

PERCEPTIONS IN FORENSIC PATHOLOGY

I RECEIVED SUFFICIENT EXPOSURE TO FORENSIC PATHOLOGY IN MEDICAL SCHOOL.

69%

of participants **strongly disagreed**, **disagreed**, or **somewhat disagreed**.

I CONSIDER THE PERCEPTION OF FORENSIC PATHOLOGY AS A SPECIALTY CHOICE AS POSITIVE.

60%

of participants **strongly disagreed**, **disagreed**, or **somewhat disagreed**.

*N=216

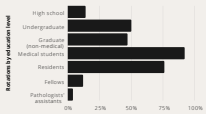
13

ME/C EDUCATION PROGRAMS

CHARACTERISITCS (N=120)

84%

ME/C EDUCATION PROGRAMS
Are facilitating student rotations during the 2023-2024 academic year



14

24%

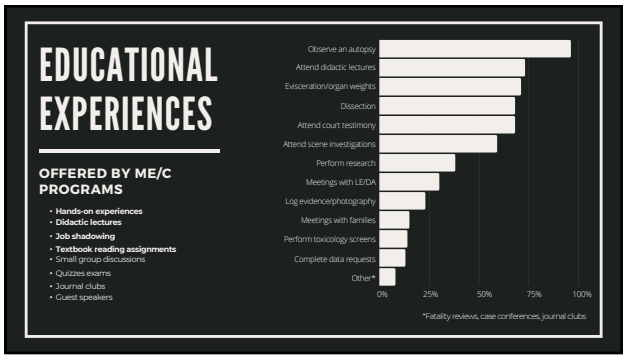
OF M.E. OFFICES IN THE U.S. ARE AFFILIATED WITH AN ACADEMIC INSTITUTION

48%

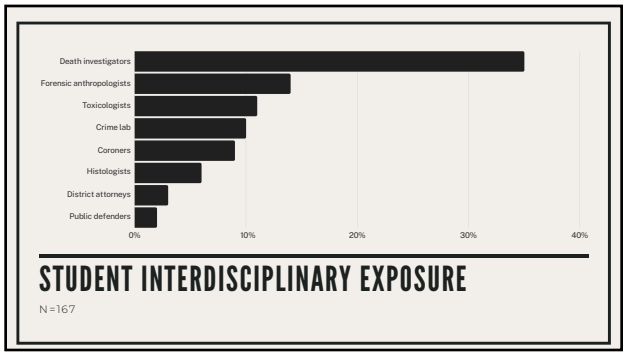
OF U.S. MEDICAL SCHOOLS ARE AFFILIATED WITH AN ME/C OFFICE

N=120

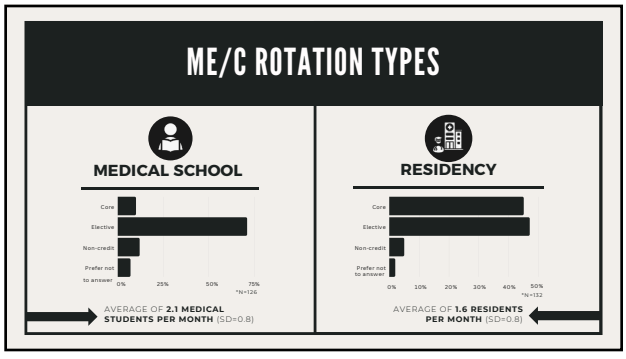
15


EDUCATIONAL EXPERIENCES
OFFERED BY ME/C PROGRAMS
• Hands-on experiences
• Didactic lectures
• Job shadowing
• Textbook reading assignments
• Small group discussions
• Quizzes exams
• Journal clubs
• Guest speakers
Observe an autopsy
Attend didactic lectures
Evisceration/organ weights
Dissection
Attend court testimony
Attend scene investigations
Perform research
Meetings with LE/DA
Log evidence/photography
Meetings with families
Perform toxicology screens
Complete data requests
Other*
0%
25%
50%
75%
100%
*Fatality reviews, case conferences, journal clubs

16

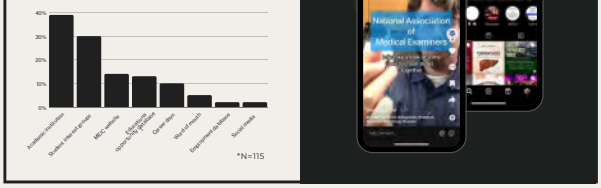

Death investigators
Forensic anthropologists
Toxicologists
Crime lab
Coroners
Histologists
District attorneys
Public defenders
0%
10%
20%
30%
40%
STUDENT INTERDISCIPLINARY EXPOSURE
N=167

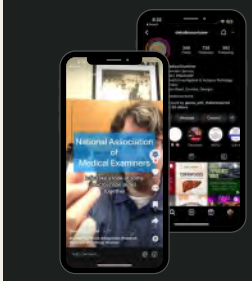
17


ME/C ROTATION TYPES
MEDICAL SCHOOL
Core
Elective
Non-credit
Prefer not to answer
0%
25%
50%
75%
*N=126
AVERAGE OF 2.1 MEDICAL STUDENTS PER MONTH (SD=0.8)
RESIDENCY
Core
Elective
Non-credit
Prefer not to answer
0%
10%
20%
30%
40%
50%
*N=132
AVERAGE OF 1.6 RESIDENTS PER MONTH (SD=0.8)

18

RECRUITMENT STRATEGIES FOR STUDENT ROTATIONS

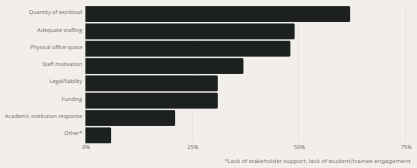




19

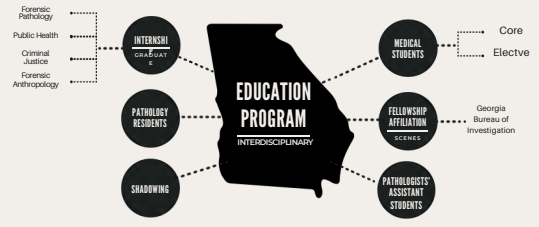
ME/C EDUCATION BARRIERS

DURING IMPLEMENTATION AND FACILITATION (N=97)



20

DEKALB COUNTY MEDICAL EXAMINER'S OFFICE



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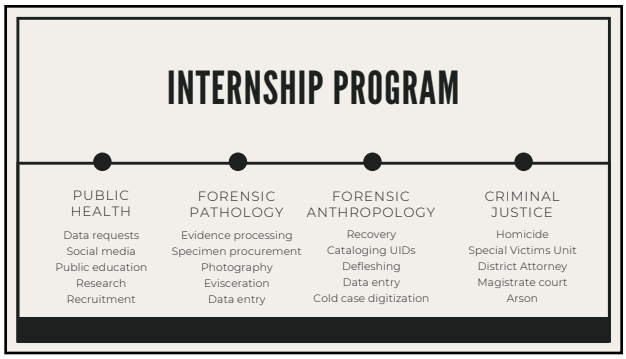
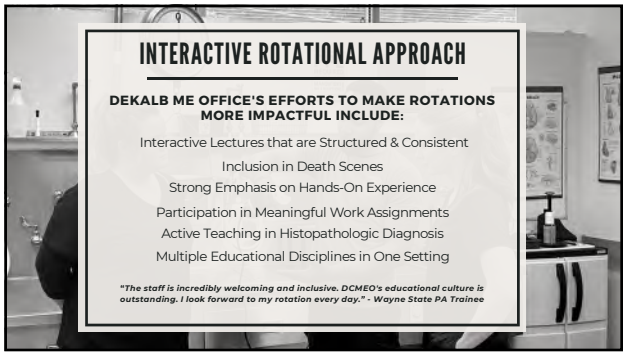

INTERNSHIP PROGRAM
PUBLIC HEALTH
Data requests
Social media
Public education
Research
Recruitment
FORENSIC PATHOLOGY
Evidence processing
Specimen procurement
Photography
Evisceration
Data entry
FORENSIC ANTHROPOLOGY
Recovery
Cataloging UIDs
Defleshing
Data entry
Cold case digitization
CRIMINAL JUSTICE
Homicide
Special Victims Unit
District Attorney
Magistrate court
Arson

22


INTERACTIVE ROTATIONAL APPROACH
DEKALB ME OFFICE'S EFFORTS TO MAKE ROTATIONS MORE IMPACTFUL INCLUDE:
Interactive Lectures that are Structured & Consistent
Inclusion in Death Scenes
Strong Emphasis on Hands-On Experience
Participation in Meaningful Work Assignments
Active Teaching in Histopathologic Diagnosis
Multiple Educational Disciplines in One Setting
"The staff is incredibly welcoming and inclusive. DCMEO's educational culture is outstanding. I look forward to my rotation every day." - Wayne State PA Trainee

23


FUTURE FORENSIC PATHOLOGISTS
21%
OF ROTATING PRE-MEDICAL INTERNS, MEDICAL STUDENTS, AND RESIDENTS
EDUCATIONAL OUTCOMES
CREATING ALLIES IN MEDICINE, PUBLIC HEALTH, GOVERNMENT, AND LAW
MEDICAL SCHOOL
Of pre-medical interns
21%
FORENSIC SCIENCE
Of non-pre-medical interns
9%

24

COMMUNITY IMPACT

- LARGE-SCALE INITIATIVES
- PUBLIC HEALTH OUTREACH
- WORKFORCE DEVELOPMENT
- GRANT PROCUREMENT

DATA MODERNIDIZATION

- Expedite data sharing
- FHIR data standardization programs
- Address real-time community trends
- Inform decision making
- Mitigate staff burnout

UIDS & COLD CASES

- Partnership with district attorney's office and NamUs
- Community DNA collection for missing persons cases
- Forensic genealogical analysis

COMMUNITY OUTREACH

- Guest speaking opportunities
- Social media engagement
- Raising awareness of emerging mortality trends
- Inform policymaking, resource allocation, and interventions

25

CITATIONS

1. Hanzlick, et al. Selecting forensic pathology as a career: A survey of the past with an eye on the future. *Am J Forensic Med Pathol*. 2008;29(2):114-122. doi: 10.1097/PAF.0b013e318174f0a9
2. Brooks, C. *Medical examiner and coroner offices.* U.S. Department of Justice. Bureau of Justice Statistics. 2021. NCJ-302051. Accessed September 25, 2023.
3. George, MR, et al. Factors influencing US osteopathic medical students to choose pathology as a specialty. *Acad Pathol*. 2022; 9. doi:10.1016/j.acpath.2022.100034
4. McCloskey, CB, et al. Factors influencing US allopathic students to choose pathology as a specialty. *Acad Pathol*. 2022;7. doi:10.1177/2374289520951924
5. Weedn, VW. & Menendez, MJ. Reclaiming the autopsy as the practice of medicine: A pathway to remediation of the forensic pathology workforce shortage. *Am J Forensic Med Pathol*. 2020;41(4):242-248. doi:10.1097PAF0000000000000589.

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LET'S CONNECT
CONTACT DETAILS
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28

From the Morgue to the Courtroom: The GBI Approach to Training Fellows to be Expert Witnesses

David Blake Behrman, M.D.
Department of Pathology and Laboratory Medicine
Emory University School of Medicine

1

Disclosure of Relevant Financial Relationships

The following faculty reported no relevant financial relationships: David Blake Behrman MD, Ari Passas JD, Rachel Askin, Natasha Grandhi MD, and Rachel Geller MD

2

Taking on the Role of Expert Witness

- Forensic pathologists wear many hats – expert witness is one
- Equal parts exciting and anxiety-provoking
- A few fears:
  - Being wrong
  - Being pressured to answer
  - Being a poor expert witness

3

Initial thoughts from current and past fellows

"It is a part of the job that you know you have to do, maybe are even excited about, but have no idea how to do it or what to expect…"

"I was vaguely familiar with the voir dire process, and I found the court room proceedings to be quite interesting and exciting."

"The legal half of "medicolegal" was an empty, mildly terrifying chasm"

4

Expert witness training doesn't always find its place in fellowship

5

Expert witness training doesn't always find its place in fellowship

6

Competence following fellowship is expected!

Interpersonal and Communication Skills 4: Medicolegal Communication

Level 1	Level 2	Level 3	Level 4	Level 5
Discusses the role of the forensic pathologist in the criminal justice system	Observes a court proceeding after reviewing the case	Meets with attorneys and/or law enforcement to discuss the case findings	Prepares and presents testimony for a routine case proceeding (actual or mock)	Prepares and presents testimony for a complex case proceeding

- ACGME sets milestones
- Pathologists as witnesses extensively written on
- Imminent requests for testimony

7

"No one is born a congenitally good witness…" so we need a starting point

Month 1 | Month 2 | Month 3 | Month 4 | Month 5

- Collaborated with legal to adapt established training used for **most** of the other forensic science divisions
- Addresses ACGME milestones and builds:
  - **competence**
  - **comfort**
  - **confidence**

8

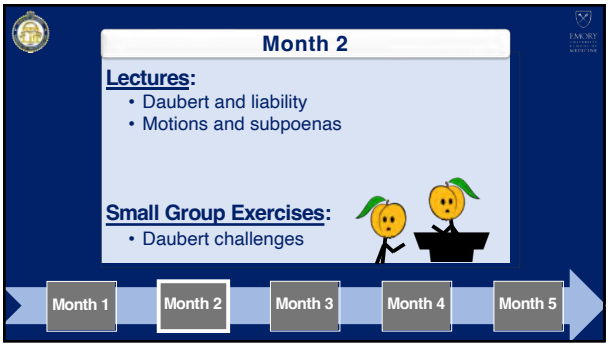
Month 1

Lectures:
- Introduction to testimony
- Courtroom layout and conduct
- Criminal vs civil testimony
- Direct and cross examination

Small Group Exercises:
- Voir dire

Month 1 | Month 2 | Month 3 | Month 4 | Month 5

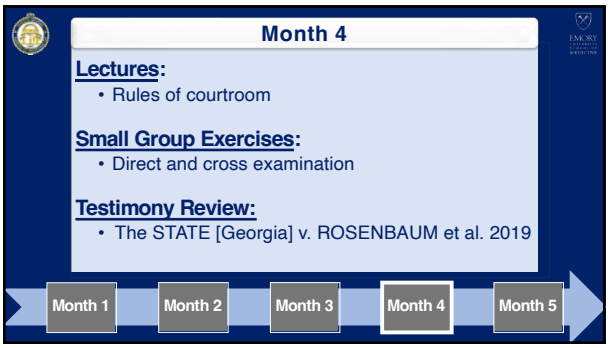
9


Month 2
Lectures:
• Daubert and liability
• Motions and subpoenas
Small Group Exercises:
• Daubert challenges
Month 1
Month 2
Month 3
Month 4
Month 5

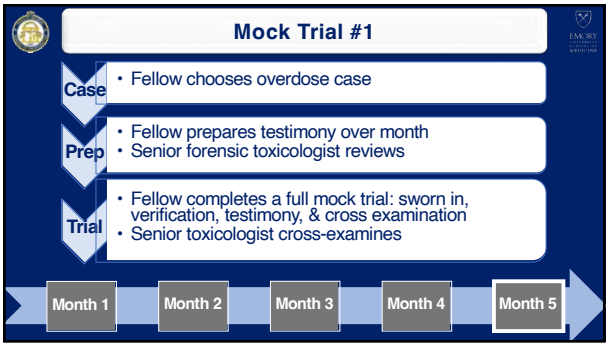
10


Month 3
Lectures:
• Open records
• Garrett vs Giglio
• Pretrial meetings/conferences
• Fed Rule 16
Small Group Exercises:
• Voir dire + Daubert challenges
Month 1
Month 2
Month 3
Month 4
Month 5

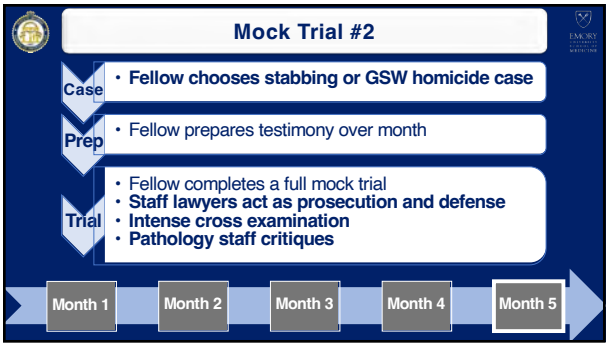
11


Month 4
Lectures:
• Rules of courtroom
Small Group Exercises:
• Direct and cross examination
Testimony Review:
• The STATE [Georgia] v. ROSENBAUM et al. 2019
Month 1
Month 2
Month 3
Month 4
Month 5

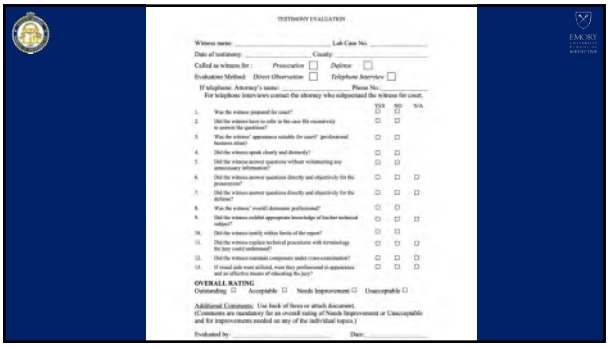
12


Mock Trial #1
Case
• Fellow chooses overdose case
Prep
• Fellow prepares testimony over month
• Senior forensic toxicologist reviews
Trial
• Fellow completes a full mock trial: sworn in, verification, testimony, & cross examination
• Senior toxicologist cross-examines
Month 1
Month 2
Month 3
Month 4
Month 5

13


Mock Trial #2
Case
• Fellow chooses stabbing or GSW homicide case
Prep
• Fellow prepares testimony over month
Trial
• Fellow completes a full mock trial
• Staff lawyers act as prosecution and defense
• Intense cross examination
• Pathology staff critiques
Month 1
Month 2
Month 3
Month 4
Month 5

14


TESTIMONY EVALUATION

15

Feedback of current fellow after curriculum

"The legal curriculum at the GBI is entirely unique to the program, and at only 3 months in, I can't imagine not having this resource…"

16

Feedback of graduated fellow after curriculum

"I testified on my first case when I was still a fellow. I was extremely nervous and was anticipating the same grueling experience from the mock trials, however… my time on the stand was very manageable and the attorneys were cordial."

17

Other programs implementing curriculum

Jul 4, 2023

Preparing forensic pathologists for the courtroom: a reimagined approach to teaching vital skills

Laboratory Medicine & Pathobiology
UNIVERSITY OF TORONTO

- Dr. Williams, program director of forensic pathology training introduced a longitudinal curriculum scheme
- Includes preparing a CV for the court, voir dire, and direct examination and cross-examination training
- "Court Testimony Training Day"

18

Conclusions

- Expert testimony and court can be major points of anxiety for new fellows
- The GBI's 5-month curriculum integrates this essential training into a one-year fellowship
- The curriculum centers on lecture series, practical exercises, testimony review, and mock trials in collaboration with legal department
- Fellows express increased competence, comfort, and confidence following the 5-month curriculum

19

References:

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- Bozec, J. Preparing forensic pathologists for the courtroom: a reimagined approach to teaching vital skills. July 4th, 2023. https://lmp.utoronto.ca/news/preparing-forensic-pathologists-courtroom-reimagined-approach-teaching-vital-skills#:~:text=This%20includes%20preparing%20a%20CV,court%20with%20them%20whenever%20possible.
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Don’t Turn a Blind Eye on Forensic Biochemistry

Dr. Thomas Auen | PGY2
Dept of Pathology and Microbiology
University of Nebraska Medical Center

Dr. Erin Linde
Physicians Laboratory Services, PC

1

Quick Housekeeping Items

- Preferred Pronouns: He/Him/His
- Declaration of Competing Interest
  - No known competing financial interests or personal relationships that could appear to influence this work
- Disclosure Statement
  - No commercial or similar relationships to products or companies related to the subject matter; no sources of funding, corporate appointments, or pertinent financial relationships need be disclosed
- Ethics Statement
  - Material is of the authors' own original work and credits meaningful contributions with proper citations

2

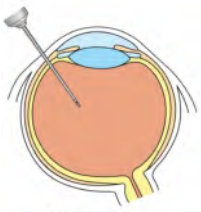
Outline

- Background
- Case Review
  - Case 1
  - Case 2
  - Case 3
  - Case 4
- Case Discussions
  - Hyponatremia
  - Obstructive Nephropathy
  - Pancreatitis and Renal Insufficiency
  - Cardiac Disease and Renal Insufficiency
  - BUN/Creatinine vs. eGFR
- Conclusion

3

Background: Vitreous

- Established history as a useful ancillary test in postmortem workup
  - Easily obtained
  - Isolated environment
  - Less susceptible to decomposition
  - Cost effective for the time being (emerging molecular means still pricy)



Vitreous aspirate

Durand ML. Bacterial and Fungal Endophthalmitis. *Clin Microbiol Rev*. 2017;30(3):597-613. doi:10.1128/CMR.00113-16

4

Background: Kidney Disease

- Kidney disease
  - >50,000 deaths in the US annually
  - Acute: rapid loss in hours to days of the kidney's excretory function
    - Pre-renal, Intrinsic, and Post-renal etiologies
  - Chronic: gradual loss of kidney function over months, years, and decades
    - Diabetes and hypertension as most common etiologies
  - Postmortem correlation differentiates between acute and chronic
- Acute Kidney Injury
  - 1/5 of hospitalizations
  - Increased mortality risk, may be no indication at time of death
  - Recognition at autopsy is limited, a reflection on training?
    - Utilization of histological identification and ancillary testing means to help identify
  - Difficulties in histologic interpretation of ATN vs. postmortem autolysis

5

Case #1: Circumstance of Death

- 73-year-old man
  - Found in mummified state in home shared with special needs family members
  - Last known alive the evening prior to being found deceased
  - Reportedly, had been feeling ill but did not seek medical care
  - Last known doctor visit 10 years prior
  - Reported heavy alcohol use

6

Case #1: At Autopsy

- 73-year-old male
  - Putrefactive decomposition w/o significant injury
  - Heart with borderline cardiomegaly including mild four chamber dilatation with atherosclerotic and hypertensive changes
    - CAD: LAD 75-90% narrowing, LCX and RCA <10% narrowing
  - Kidneys with hypertensive and obstructive nephropathy, arteriosclerosis and arteriolosclerosis
  - Lungs with emphysema and pulmonary hypertension
  - Brain with low-grade meningioma of the right parietal dura
  - Tox: 0.029% ethanol from heart blood
  - Vitreous revealed renal insufficiency
    - BUN: >140 mg/dL
    - Creatinine: 7.1 mg/dL
    - eGFR: 8 (5)

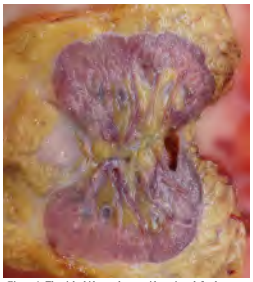


Figure 1. The right kidney, shown with perirenal fat due to difficulty in stripping the capsule, demonstrated a thick fibrous capsule with faint corticomedullary junction and thinning of the renal cortex (0.2 cm) at autopsy. Mild blunting of the medullary pyramids and increased renal sinus adipose tissue was noted along with right renal pelvis and ureter dilatation.

7

Case #1: Cause of Death

- 73-year-old male
  - Putrefactive decomposition w/o significant injury
  - Heart with borderline cardiomegaly including mild four chamber dilatation with atherosclerotic and hypertensive changes
    - CAD: LAD 75-90% narrowing, LCX and RCA <10% narrowing
  - Kidneys with hypertensive and obstructive nephropathy
  - Lungs with emphysema and pulmonary hypertension
  - Brain with low-grade meningioma of the right parietal dura
  - Tox: 0.029% ethanol from heart blood
  - Vitreous revealed renal insufficiency
    - BUN: >140 mg/dL
    - Creatinine: 7.1 mg/dL
    - eGFR: 8 (5)

COD: Renal insufficiency complicating atherosclerotic and hypertensive cardiovascular disease

8

Case #2: Circumstance of Death

- 46-year-old male
  - Last confirmed alive the day prior to death
  - Found down floor of his bedroom
  - Failed to show up for work, mother could not reach him and found him upon checking his room
  - Medically obese, records revealed asthma, breathing issues, and unspecified heart issues
  - Marijuana found in apartment along with various supplements and energy drinks

9

Case #2: At Autopsy

- 46-year-old male
  - Morbid obesity w/o injury
  - Heart with borderline cardiomegaly and left ventricular dilatation, interstitial edema and mild perivascular fibrosis
  - Mild renal arteriosclerosis
  - Lungs with pulmonary congestion and edema
  - Brain with mild cerebral edema with cerebellar tonsillar prominence
  - Tox: 2.9 ng/mL delta-9-THC, 41.6 ng/mL THC-COOH, caffeine, and cotinine in iliac blood
  - Vitreous revealed hyponatremic dehydration with renal insufficiency
    - Sodium: 111 mmol/L
    - BUN: within normal limits
    - Creatinine: 3.9 mg/dL
    - eGFR: 18 (4)

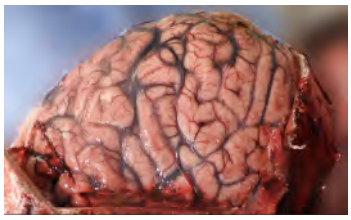


Figure 2. Along with congestion of the leptomeningeal vasculature, mild to moderate cerebral edema was noted at autopsy along with cerebellar tonsillar prominence. No herniation was identified. The edematous features identified are consistent with the decedent's hyponatremia dehydration and sodium value of 111 mmol/L.

10

Case #2: Cause of Death

- 46-year-old male
  - Morbid obesity w/o injury
  - Heart with borderline cardiomegaly and left ventricular dilatation, interstitial edema and mild perivascular fibrosis
  - Mild renal arteriosclerosis
  - Lungs with pulmonary congestion and edema
  - Brain with mild cerebral edema with cerebellar tonsillar prominence
  - Tox: 2.9 ng/mL delta-9-THC, 41.6 ng/mL THC-COOH, caffein, and cotinine in iliac blood
  - Vitreous revealed hyponatremic dehydration with renal insufficiency
    - Sodium: 111 mmol/L
    - BUN: within normal limits
    - Creatinine: 3.9 mg/dL
    - eGFR: 18 (4)

COD: Hyponatremic dehydration with renal insufficiency

11

Case #3: Circumstance of Death

- 27-year-old female
  - Cholecystectomy the day prior to death
  - Found by her boyfriend
  - Medical record review highlights history of acute pancreatitis secondary to alcohol use/abuse, alcoholism with withdrawal, and depression
  - Presented to the ED with mild pancreatitis the week prior to death, for this underwent uncomplicated laparoscopic cholecystectomy

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Case #3: At Autopsy

- 27-year-old female
  - Pancreas with chronic inflammation and pseudocyst
  - Liver with steatohepatitis
  - Heart with cardiomegaly and mild left ventricular dilatation
  - Lungs with pulmonary congestion and edema
  - Brain with mild cerebral edema
  - Tox: 11.4 ng/mL hydrocodone and caffeine in iliac blood; hydromorphone, hydrocodone, norfentanyl, oxycodone, and oxymorphone in urine
  - Vitreous with hyponatremia and renal insufficiency
    - Sodium: 128 mmol/L
    - BUN: within normal limits
    - Creatinine: 2.7 mg/dL (antemortem 0.74 and 0.89)
    - eGFR: 24 (4)

Figure 3. Lobulated and diffusely red-pink at autopsy, the pancreas was involved by multifocal fat necrosis extending from the head of the organ to its tail; no definitive hemorrhage was seen. At the tail (white asterisks) was a cystic collection of necrotic debris (6.5 cm maximum dimension) consistent of a pancreatic pseudocyst.

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Case #3: Cause of Death

- 27-year-old female
  - Pancreas with chronic inflammation and pseudocyst
  - Liver with steatohepatitis
  - Heart with cardiomegaly and mild left ventricular dilatation
  - Lungs with pulmonary congestion and edema
  - Brain with mild cerebral edema
  - Tox: 11.4 ng/mL hydrocodone and caffeine in iliac blood; hydromorphone, hydrocodone, norfentanyl, oxycodone, and oxymorphone in urine
  - Vitreous with hyponatremia and renal insufficiency
    - Sodium: 128 mmol/L
    - BUN: within normal limits
    - Creatinine: 2.7 mg/dL (antemortem 0.74 and 0.89)
    - eGFR: 24 (4)

COD: Hyponatremia with renal insufficiency

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Case #4: Circumstance of Death

- 65-year-old male
  - Confirmed alive two days prior to death
  - Found face down on the floor of his locked apartment after family member was unable to get an answer at his door
    - Without pants, bruising and marks on his buttocks, blood around the sites of bruising
  - Reportedly had no health conditions, occasionally used alcohol, used tobacco

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Case #4: At Autopsy

- 65-year-old male
  - Bladder markedly distended with 1050 mL of yellow-brown urine
  - Right ureter mildly dilated
  - Prostate enlarged and nodular
  - Kidney with incidental RCC
  - Tox: heart blood and urine negative
  - Vitreous with renal insufficiency
    - BUN: 243 mg/dL
    - Creatinine: 21.4 mg/dL
    - eGFR: 2.1 (G5)

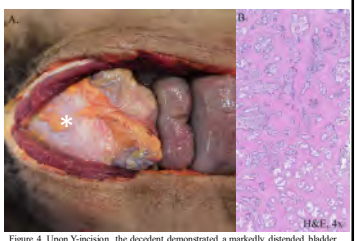

Figure 4. Upon Y-incision, the decedent demonstrated a markedly distended bladder (white asterisks) containing approximately 1050 mL of yellow-brown urine (A). Additional right ureter dilatation was found and consistent with obstructive uropathy secondary to nodular prostatic hyperplasia noted by gross enlargement and histologic review shown with H&E at 4x magnification (B).

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Case #4: Cause of Death

- 65-year-old male
  - Bladder as markedly distended with 1050 mL
  - Right ureter mildly dilated
  - Prostate enlarged and nodular
  - Kidney with incidental RCC
  - Tox: heart blood and urine negative
  - Vitreous with renal insufficiency
    - BUN: 243 mg/dL
    - Creatinine: 21.4 mg/dL
    - eGFR: 2.1 (G5)

COD: Renal insufficiency due to obstructive uropathy due to nodular prostatic hyperplasia

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Case Discussions

- Hyponatremia: Cases 2 and 3
  - Both cases of hyponatremia with renal insufficiency identified with vitreous analysis
- Historic alcohol use/abuse: Cases 1 and 3
- Obstructive nephropathy: Cases 1 and 4
  - Case 1 obstruction not identified, morphologic and histologic evidence in kidneys
  - Case 4 obstruction linked to BPH
- Renal insufficiency in the setting of chronic pancreatitis: Case 3
  - Historical episodes of acute pancreatitis
- Renal insufficiency complicating atherosclerotic disease and hypertension: Case 1

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Creatinine/BUN vs. eGFR

- Initial COD was determined based on vitreous values of creatinine supplemented by BUN changes
- Additional steps taken to calculate eGFR
  - Maskell et al and Zhu et al
  - Specificity and sensitivity for eGFR is increased and better suited for calling renal impairment in postmortem workup
- Calculation of eGFR with CKD-EPI formula in our four cases reflect end-stage renal disease values and general renal insufficiency
  - CKD-EPI: $GFR = 141 \times \min(Scr/\kappa, 1)^{\alpha} \times \max(Scr/\kappa, 1)^{-1.209} \times 0.993^{Age} \times 1.018$ [if Female] _ 1.159 [if Af Am]
  - Note: K is a variable representing male vs. female (not potassium)

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Conclusion

- Postmortem biochemistry is a useful tool for forensic pathology
- Vitreous humor continues to be an essential biochemical source for the forensic/postmortem investigation of clinically significant electrolyte disturbances
- Renal insufficiency is a significant cause of morbidity and mortality, which may be overlooked at the time of postmortem examination
- Renal insufficiency can be easily assessed via vitreous electrolyte examination and should be considered when investigating cause of death

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22

METHOD VALIDATION STUDY OF DIPSTICK URINALYSIS AS A SCREENING TOOL FOR SODIUM NITRITE TOXICITY

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Laura D. Knight, MD, Washoe County Regional Medical Examiner's Office, and University of Nevada Reno, School of Medicine

1

INCREASED INCIDENCE OF SODIUM NITRITE TOXICITY

TOXICOLOGY TIME AND COSTS

INEXPENSIVE TABLESIDE SCREENING TOOL

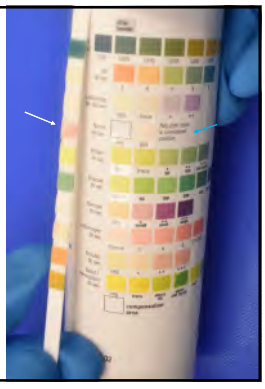
THE IDEA

2

THE STUDY

Urinalysis dipstick
- Fourth reagent pad: Nitrite
  - 0.05 mg/dL (8 mcM)

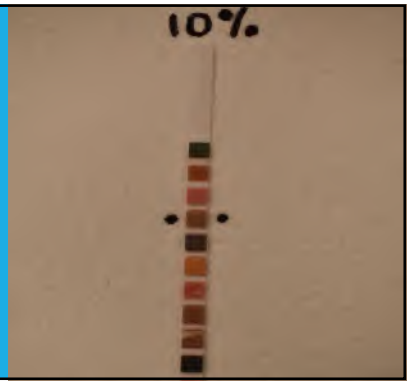
Samples
- Blood
- Urinie
- Vitreous humor
- Gastric content



Private Information

3

BLOOD SAMPLE



4

CASE DEMOGRAPHICS

Overview	Controls
11 cases tested	4 cases
Ages: 21 to 65, mean of 37.4 years	COD: Motor vehicle accident x4
Gender: 9 males, 1 female	MOD: Accident x4

Private Information

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CASE DEMOGRAPHICS

Sodium nitrite/nitrate toxicity	Alkyl nitrite toxicity
4 cases	3 cases (2 inhalation, 1 ingestion)
COD: Nitrite/nitrate toxicity	COD: Alkyl nitrite toxicity x 3
MOD: Suicide x4	MOD: Accident x2 Undetermined x1
(1 combined with ethanol, 1 associated depression)	

Private Information

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RESULTS: CONTROL CASES MOTOR VEHICLE ACCIDENTS

Private Information

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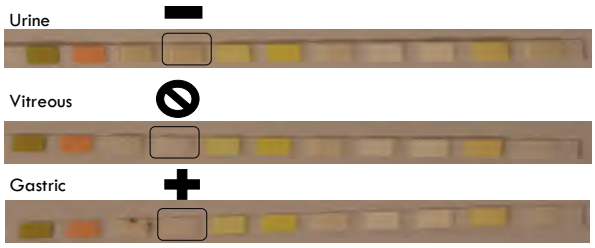
RESULTS: CONTROL CASE 1



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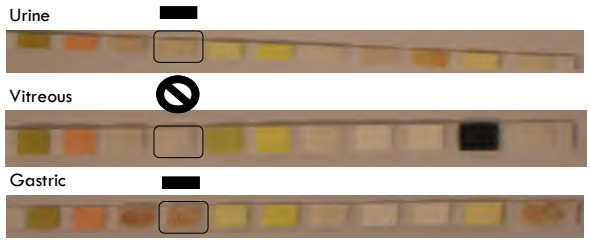
RESULTS: CONTROL CASE 2



Private Information

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RESULTS: CONTROL CASE 3

Urine

Vitreous

Gastric

Private Information

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RESULTS: CONTROL CASE 4

Urine

Vitreous

Gastric

Private Information

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CONTROL SUMMARY

Case	Urine dipstick	Vitreous dipstick	Gastric dipstick	Blood Toxicology
Case 1	Negative	Equivocal	Positive	N/A
Case 2	Negative	Equivocal	Negative	N/A
Case 3	Negative	Negative	Negative	N/A
Case 4	Negative	Negative	Negative	N/A

Private Information

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SODIUM NITRITE INGESTION CASES

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RESULTS: SODIUM NITRITE INGESTION CASE 1

Private Information

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RESULTS: SODIUM NITRITE INGESTION CASE 2

Private Information

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RESULTS: SODIUM NITRITE INGESTION CASE 3

Urine −

Vitreous +

Gastric ⊘

Private Information

16

RESULTS: SODIUM NITRITE INGESTION CASE 4

Urine +

Vitreous +

Gastric ⊘

Private Information

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SODIUM NITRITE INGESTION CASES SUMMARY

Case	Urine dipstick	Vitreous dipstick	Gastric dipstick	Blood Toxicology Nitrite/Nitrate Level
Case 1	Positive	Positive	N/A	>1,000 mcM
Case 2	Negative	Positive	Positive	>1,000 mcM
Case 3	Negative	Positive	N/A	7,000 mcM
Case 4	Positive	Positive	Negative	6,400 mcM

Private Information

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ALKYL NITRITE TOXICITY CASES

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RESULTS: ALKYL NITRITE CASE 1 (INHALATION)

Urine [redacted]

Vitreous [redacted]

Gastric

- No sample available for testing

Private Information

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RESULTS: ALKYL NITRITE CASE 2 (INHALATION)

Urine [redacted]

Vitreous [redacted]

Gastric [redacted]

Private Information

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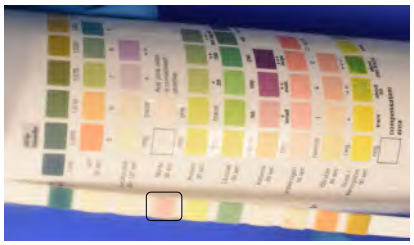
RESULTS: ALKYL NITRITE CASE 3 (INGESTION)

Urine

✚

Vitreous
- Not tested

Gastric
- Not tested



Private Information

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ALKYL NITRITE TOXICITY SUMMARY

Case	Urine dipstick	Vitreous dipstick	Gastric dipstick	Blood Toxicology Nitrite/Nitrate Level
Case 1	Negative	Negative	N/A	34 mcM
Case 2	Negative	Negative	Negative	810 mcM
Case 3	Positive	N/A	N/A	>1,000 mcM

Private Information

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CONCLUSION

- Urine test strips **are** a useful adjunct to laboratory testing for nitrite toxicity
- Vitreous fluid and urine appear to be the most reliable
- Gastric liquid may be useful in oral ingestion
- Blood cannot be tested due to unwanted ancillary color change
- Urine test strips **are not** useful in alkyl nitrite ***inhalation*** *cases*
- Confirmatory laboratory testing is recommended as a follow-up to presumptive tableside testing

Private Information

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ACKNOWLEDGEMENTS

Brianna Peterson, PhD, forensic toxicologist from NMS Laboratories

Washoe County Regional Medical Examiner's Office

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QUESTIONS? THOUGHTS?

CONTACT ME!

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THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
School of Medicine, Department of Pathology

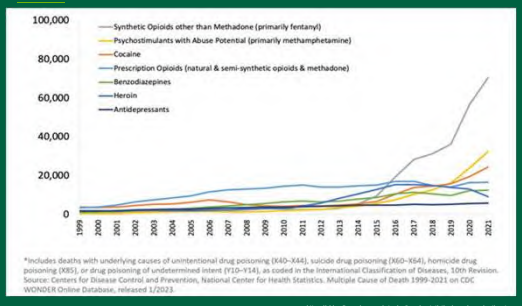
Toxicological analysis of brain, liver, and maggots in decomposition cases to assist with cause of death determination

Amy E Theriault, DO

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
School of Medicine, Department of Pathology

I have no financial disclosures
The opinions expressed in this presentation are mine and do not represent those of UAB

National Drug-Involved Overdose Deaths 1999-2021

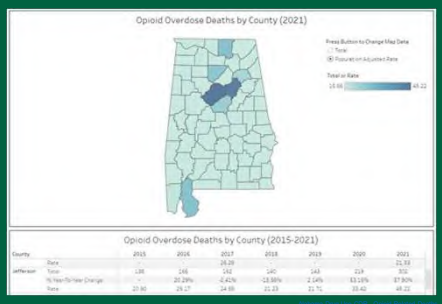


*Includes deaths with underlying causes of unintentional drug poisoning (X40–X44), suicide drug poisoning (X60–X64), homicide drug poisoning (X85), or drug poisoning of undetermined intent (Y10–Y14), as coded in the International Classification of Diseases, 10th Revision. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2021 on CDC WONDER Online Database, released 1/2023.

https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates

Jefferson County, overdose deaths

Jefferson County, opioid deaths

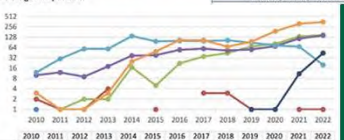


Jefferson County, historical summary

Historical Summary: Illicit Drugs/Poisons, 2010-2022

Figure 6.4: represents illicit drugs and poisons.

Drug:	
Opioid	374
Other drugs – Rx and illicit drugs	65
Ethanol (alcohol) – acute toxicity	4



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Ethylene Glycol (antifreeze)	1	0	0	0	0	0	0	0	0	0	0	1	1
Difluoroethane (refrigerant)	2	1	1	4	0	1	0	3	3	1	0	1	1
Methamphetamine	3	1	2	2	17	5	22	35	44	69	82	134	148
Cocaine	10	12	9	18	37	38	55	59	52	56	70	117	143
Heroin	12	30	58	58	138	97	100	98	103	89	74	68	20
Fentanyl	3	1	1	3	25	49	106	104	68	95	190	316	355
Xylazine	0	0	0	0	0	0	0	0	0	1	1	11	44

NAME intoxication death investigation

- Autopsy is an essential component
- Scene investigation & prescription reconciliation
- Retain blood, urine, vitreous
  - peripheral blood preferred
- Toxicological panel
  - potent depressants
  - stimulants
  - antidepressants
  - novel substances may require special testing

Recommendations for the Investigation, Diagnosis, and Certification of Deaths Related to Opioid and Other Drugs

Research question

2013 to 2022: Jefferson County had 95 advanced decomposition cases with toxicology samples submitted.

We looked at 73 of these cases.

Was brain, liver, and/or maggots helpful to determine cause of death?

Factors affecting concentration

Decreasing

- Ongoing tissue uptake
- Metabolic/chemical changes
- Decomposition processes including bacteria

Site dependent

- Postmortem redistribution

Increasing

- Decomposition processes including bacteria

Result interpretation

- Decedent drug tolerance
- Poly-drug use
- Metabolic influences – age, disease state, genetics

Sample desirability

Brain
- Protected in skull
- Less metabolic activity
- Limited reference data
- Drug concentration may vary by region

Liver
- Abundant, easily collected, easy to prepare
- Large reference database
- Breaks down quickly

Maggots
- Difficult to process
- No reference ranges

Unexpected results found in larvae samples from two postmortem forensic cases

Olwen Groth[1] · Simon Franz[2] · Helena Fels[2] · Julia Krueger[2] · Gabriele Roider[1] · Torsten Dame[2] · Frank Musshoff[2] · Matthias Graw[1]

Forensic Toxicology (2022) 40:144–155
https://doi.org/10.1007/s11419-021-00601-x
Received: 26 April 2021 / Accepted: 6 October 2021 / Published online: 6 November 2021

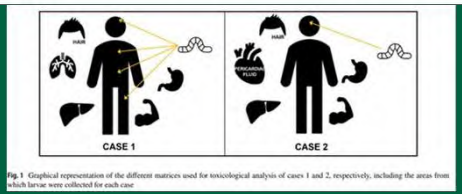


Fig. 1 Graphical representation of the different matrices used for toxicological analysis of cases 1 and 2, respectively, including the areas from which larvae were collected for each case

Conclusion

- Can reliably detect the presence of drugs
- Quantification in larvae produces variable results
  - Limited value to estimate lethal dosages
  - Lack standardized methods for extraction and analysis
- Preserve larvae in cases where they are present on and inside the body
- Consider as additional option for detecting substances in drug-related fatalities

Received: 29 January 2021 | Revised: 11 March 2021 | Accepted: 12 March 2021
DOI: 10.1002/dta.3029

RESEARCH ARTICLE

WILEY

Determination of drugs in exhumed liver and brain tissue after over 9 years of burial by liquid chromatography–tandem mass spectrometry—Part 2: Benzodiazepines, opioids, and further drugs

Katarina Bolte[1] | Marek Dziadosz[1] | Naomi Kono[1] | Benedikt Vennemann[2] | Michael Klintschar[1] | Jörg Teske[1]

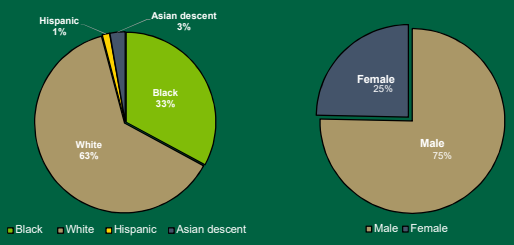
Drug Testing Analysis 2021;13:1318–1330.

Conclusion

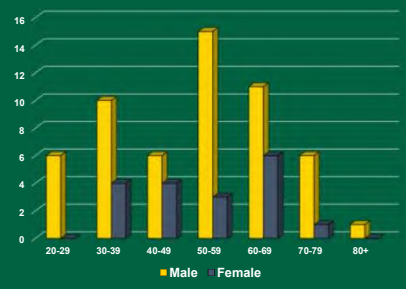
- Qualitative results of decomposed specimens can be obtained
  - Opioids more so than benzodiazepines
  - Liver vs brain
- Percent positive findings varied based on drug and tissue type
- No correlation between post-mortem interval, tissue condition and positive findings

Toxicological analysis of atypical postmortem specimens from the Jefferson County Coroner/ Medical Examiner's Office, 2013-2022

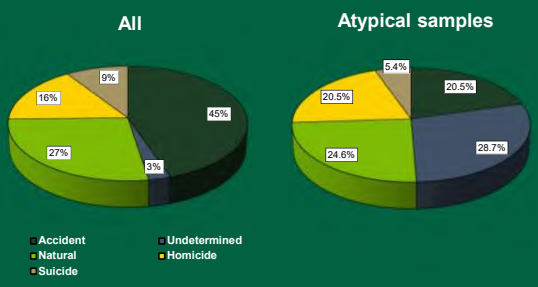
Demographics



Demographics



Manner of death 2013-2022



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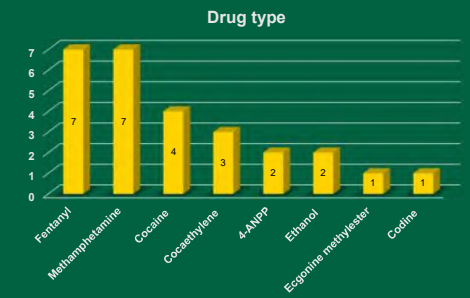
Accidental, Drug related, 13 Cases



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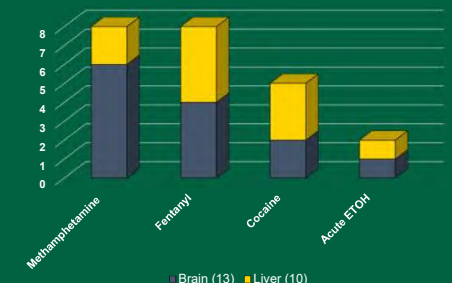
Cause of death, acute overdose



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Homicide and suicide cases

Toxicological Findings			
15 Homicide cases (10 brain, 3 liver, 2 larvae)			
Ethanol	3	NDD	8
Methamphetamine	3	Cocaine	2
Fentanyl	1		
4 Suicide cases (2 brain, 1 liver, 1 larvae)			
Ethanol	3	NDD	1

Natural Cases

Toxicological Findings			
Cardiovascular (3 brain, 3 larvae, 2 liver)			
Ethanol	1	NDD	7
Natural (4 brain, 3 liver)			
Ethanol	5	NDD	2
Chronic drug or ethanol use (2 brain, 1 liver, 1 larvae)*			
Ethanol	1	NDD	2

* Sample not suitable

Conclusion

- **71% of cases did have cause of death attributed after sample analysis**
- **Brain and liver samples are the most useful to identify or rule out drug intoxication deaths**
- **Larvae were used 11 times, NDD in all specimens**
- **Collect multiple atypical specimens, including larvae, as available and according to standardized procedures to facilitate analysis**

Future work

Decomposition fluid samples

References

National Association of Medical Examiners. Recommendations for the Investigation, Diagnosis, and Certification of Deaths Related to Opioid and Other Drugs. Accessed at https://name.memberclicks.net on September 23, 2023.

Bolte, K., Dziadosz, M., Kono, N., Vennemann, B., Klintschar, M., Teske, J. (2021). Determination of drugs in exhumed liver and brain tissue after over 9 years of burial by liquid chromatography–tandem mass spectrometry—Part 2: Benzodiazepines, opioids, and further drugs. *Wiley Analytical Science: Drug Testing and Analysis*, 13 (7):1318-1330.

Groth, U., Franz, S., Fels, H., Krueger, J., Roider, G., Dame, T., Musshoff, F., and Graw, M. (2022). Unexpected results found in larvae samples from two postmortem forensic cases. *Forensic Toxicology*, 40:144-155.

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School of Medicine, Department of Pathology

Thank you!

Questions?

MDMB-4en-PINACA-Related Deaths in Cook County Jail and the Urgent Need for Awareness and Prevention

Cook County Medical Examiner's Office

Lorenzo Gitto, Tracy Wadsworth, Daniel Isenschmid, Alex J Krotulski, Barry K Logan, Ponni Arunkumar

1

BACKGROUND

- Synthetic cannabinoids were initially created as alternatives to natural cannabinoids in research.
- They have since evolved in both academic and illicit markets.
  - "K2", "Spice", "rat poison"
- Synthetic cannabinoids have distinct structural parts: head, linker, core, and tail sections, with various variations that create potent subfamilies.
- The JWH series, the most well-known family of synthetic cannabinoids, was the first widely distributed illicit group, comprising hundreds of compounds.

2

BACKGROUND

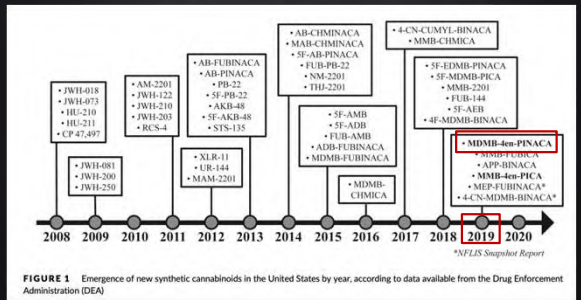

FIGURE 1 Emergence of new synthetic cannabinoids in the United States by year, according to data available from the Drug Enforcement Administration (DEA)

Krotulski AJ, Cannaert A, Stove C, Logan BK. The next generation of synthetic cannabinoids: Detection, activity, and potential toxicity of pent-4en and but-3en analogues including MDMB-4en-PINACA. Drug Test Anal. 2021 Feb;13(2):427-438. doi: 10.1002/dta.2935.

3

MDMB-4en-PINACA

- 3,3-dimethylbutanoic acid ((S)-3,3-dimethyl-2-(1-(pent-4-en-1-yl)-1H- indazole-3-carboxamido)butanoic acid)
- New generation synthetic cannabinoid with alkene tails which has been reported in Europe and the United States in 2018 and 2019, respectively.
- MDMB-4en-PINACA is used to adulterate THC products , and it is commonly found in association with other drugs, such as novel synthetic opioids or other novel psychiatric substances.
- Strong affinity for cannabinoid receptors CB1 and CB2.

4

MDMB-4en-PINACA

- It undergoes rapid liver metabolism, involving ester hydrolysis, hydroxylation, and acetylation pathway*
  - *represents a novel metabolic route for SC receptor agonists
- Reported adverse s/s: impaired hippocampal functions, psychosis, agitation, irritability, paranoia, confusion, anxiety, hallucinations, delusions, delirium, self-harm, hypertension, cardiac arrhythmias, chest pain, tachypnea, gastrointestinal distress, acute kidney injury, nausea, vomiting, fever, hyperglycemia, hypokalemia, respiratory depression, and even death.

5

FIGURE 4 Heat map for MDMB-4en-PINACA positivity [Colour figure can be viewed at wileyonlinelibrary.com]

(Data from 2021 – Illinois excluded)

Krotulski AJ, Cannaert A, Stove C, Logan BK. The next generation of synthetic cannabinoids: Detection, activity, and potential toxicity of pent-4en and but-3en analogues including MDMB-4en-PINACA. Drug Test Anal. 2021 Feb;13(2):427-438. doi: 10.1002/dta.2935.

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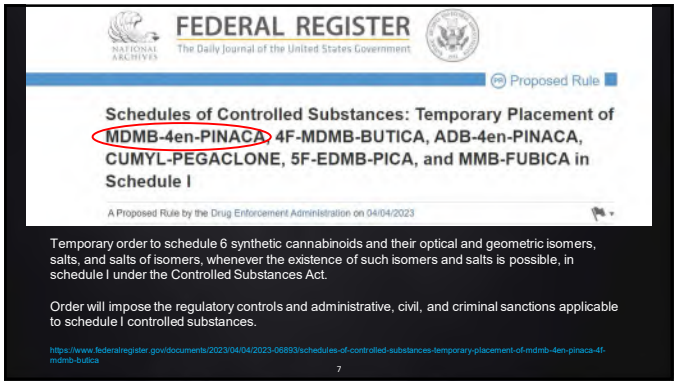
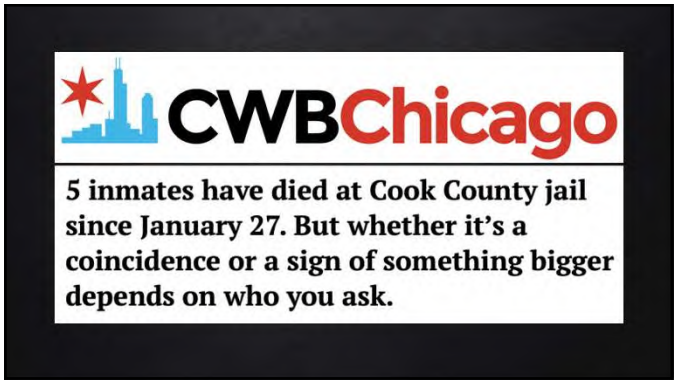


7

BACKGROUND

- Three accidental fatalities attributed to MDMB-4en-PINACA occurred between January and April 2023 at the Cook County Jail in Chicago, Illinois.
- These incidents have raised significant concerns about the potential spread of this substance within the correctional facility.

8



9

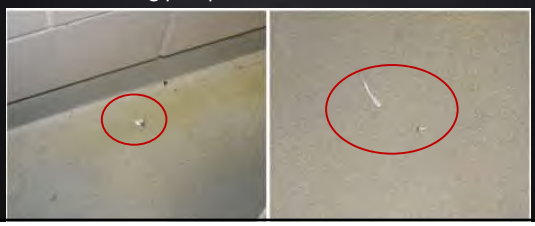
BACKGROUND

- This study aims to raise public awareness regarding MDMB-4en-PINACA.
- Highlighting its unpredictable effects and the potential for severe adverse reactions and toxicity.
- To facilitate the development of effective prevention and harm reduction strategies.

10

Case 1

- 57-year-old white male found unresponsive sitting against the jail latrine wall.
- Witnessed to be taking shallow breaths moments prior.
- Possible drug paraphernalia on scene.



Partially burnt pieces of toilet paper "wicks".

11

Case 1

- No external trauma.
- Autopsy: pulmonary congestion and edema, cerebral edema, and hepatosteatosis.
- Toxicology: Peripheral blood from the inferior vena cava positive for MDMB-4en-PINACA.

12

Case 2

- 23-year-old Black male found unresponsive supine on the floor of his cell.
- Minutes prior he appeared to be speaking with another inmate and passing items under his cell door.
- Moments later during rounds by the corrections officer, he was reportedly lying on the floor and moving his head, however he appeared unable to talk and subsequently went unresponsive.

13

Case 2

- Possible drug paraphernalia on scene.

Strips of "cigarette papers", partially burnt pieces of paper, and a folded playing card.

14

Case 2

- Police reported hand-written letters to other inmates indicating intention to sell strips of papers if they were to send payment via mobile payment apps
- No external trauma.
- Autopsy: pulmonary congestion and cerebral edema.
- Toxicology: Peripheral blood from the inferior vena cava positive for MDMB-4en-PINACA and protonitazene.

15

Case 3

- 25-year-old black male found unresponsive in his cell by another inmate who alerted the jail Officer.
- Possible drug paraphernalia on scene.

Ashes and burnt strips of paper. On his bed, were areas of burnt fabric.

16

Case 3

- No external trauma.
- Autopsy: pulmonary edema.
- Toxicology: Peripheral blood from the inferior vena cava positive for MDMB-4en-PINACA and protonitazene.

17

Discussion

The rapid occurrence of fatalities at Cook County Jail highlights concerns about MDMB-4en-PINACA spreading and causing widespread toxicity.

It's crucial to implement prevention measures in correctional facilities to curb illicit drug circulation and incarceration overdose deaths.

18

Prevention strategies

- Prevent drugs from entering the facility (screening measures)
- Prevent Synthetic Cannabinoids (SCs) deaths and intoxication if they have already entered the jail (confiscate drugs, paraphernalia, and means of ignition)
- Actions if a SCs death or intoxication occurs (re-evaluate and prevent future episodes)

19

CHALLENGES

- Synthetic cannabinoids (SCs) lack odor and color → hard to detect by **traditional screenings.**
- Screening for SCs is challenging due to diverse chemical structures, evolving analytes, and detection technology limitations.
- Typically enters the jail via paper documents*, herbal mixtures, food and drinks, solid materials, clothing, cosmetics, and e-liquids.
  - *Paper matrices are used most common.

20

CHALLENGES

- SCs are typically sprayed on paper items and smuggled into correctional facilities via postal mail or visits.
- Papers are torn into small strips for discreet use, ease of hiding, and distribution
  - A single drug-soaked sheet can be worth 1000$.

21

CHALLENGES

- Inmates consume SCs via **smoking**, licking, chewing, or swallowing the paper strips; often igniting them with improvised methods.
- Uneven substance distribution on paper surfaces, with "hot spots" of high drug concentration and areas of low concentration, can lead to variable toxicity and sampling errors during drug identification.
- When undetected, this can lead to multiple cases of toxicity in a short timeframe.

22

Prevent SCs from entering the facility: a national perspective

- In response to increased synthetic cannabinoids use in US correctional facilities, some states shifted to digital mail; Pennsylvania was 1st in 2018.
  - Florida, New Mexico, North Carolina, and California followed.
- Texas banned certain types of mail (greeting cards, postcards, and artwork made with glue or paint).
- Indiana and Michigan also imposed limitations on mail in prisons.

23

Prevent SCs from entering the facility: a national perspective

- Though effective in curbing drug smuggling, these measures have faced criticism and legal challenges for potentially violating inmates' rights.
- Transitioning to a fully digital system is logistically complex and resource-intensive.

24

Prevent SCs from entering the facility: Cook County jail

- Enhanced examination of arrest reports to identify those with drug-related charges.
- Drug testing for in-custody individuals, with disciplinary consequences for those using substances.
- Introduction of intake drug testing for incoming detainees to address substance use and identify prior substance use.
- Widespread strip searches for individuals suspected of substance use or contraband possession, including visual checks, property inspections, and scans.
- Increased cell and pat-down searches for inmates.

25

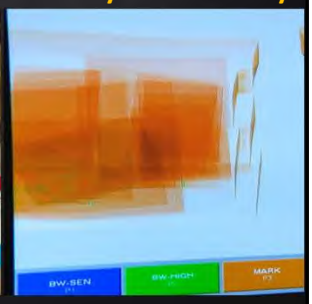
Prevent SCs from entering the facility: Cook County jail

- Mailroom searches have been intensified to detect drug contraband being introduced through the mail
- On average, the Cook County jail receives 20,000 pieces of mail per year, and approximately 11,000 of these items are confiscated for various reasons.
- After the recent increase of synthetic cannabinoids-related deaths, each mail package and letter goes through a new screening process.

26

Prevent SCs from entering the facility: Cook County

K-9 dogs



X-RAYS

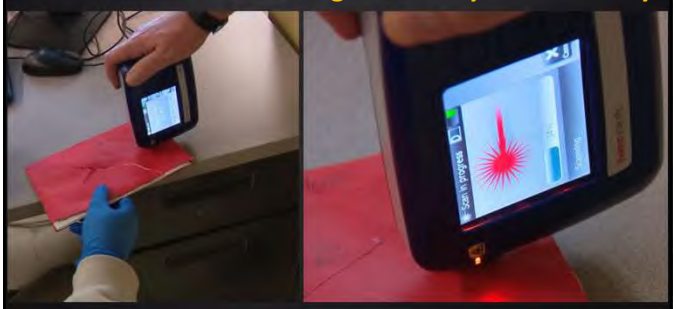
27

Prevent SCs from entering the facility: Cook County

Manual sorting and screening

28

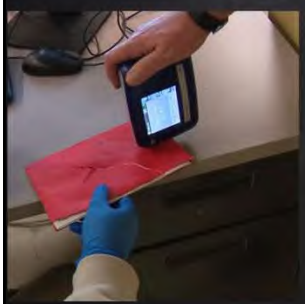
Prevent SCs from entering the facility: Cook County



Field handheld devices

29

Prevent SCs from entering the facility: Cook County



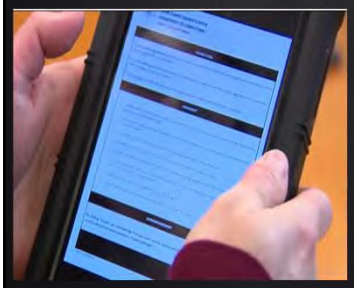
Field handheld devices

LIMITATIONS

- These devices are employed for screening specific drugs.
- They may lack comprehensive information on emerging SCs.
- When these drugs are found on plant technology struggles to differentiate the drugs from background interference.

30

Prevent SCs from entering the facility: Cook County



- To cut down on physical mail, the sheriff's office introduced a tablet program for inmates.
  - E-learning and phone calls.
  - Future plans to expand to text messaging and video calls.
- Currently, there are over 2,000 tablets, with the aim of eventually providing one for every two detainees.

31

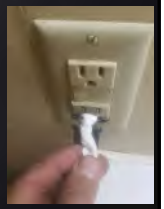
Prevent SCs-deaths and intoxication when it has entered the jail

- Providing **education** and awareness about the dangers of synthetic drug use to the Jail staff and inmates.
- Informational flyers are distributed throughout the Cook County jail.
- Public Service Announcement videos have also been created in collaboration with Cermak Health Services.

32

Prevent SCs-deaths and intoxication when it has entered the jail

- SCs typically require ignition for use.
- Preventing the use of lighters or other sources of ignition may help decrease the chance of potential overdose.
  - Inmates obtain contraband lighters.
  - Use unconventional methods of ignition.
    - Aluminum foil in electrical outlets or microwaves.
    - Rolled toilet paper wicks in augmented light fixtures and outlets.
    - Foil, candy wrappers, or wiring with batteries.



33

If a SCs death or intoxication occur

- ME/Coroner Offices and Hospital's should promptly collect blood in a gray top tubes (NaF preservative).
- Send the specimen to CFSRE for expanded panel, synthetic cannabinoid panel, and NPS testing in possible overdose cases.
- Results within 48 hours, that can be relayed to the jail authorities, public health agencies, and the DEA for further action if novel drugs are detected.

34

If a SCs death or intoxication occur

- Prompt results and immediate action, including medical intervention, are essential upon a positive test to determine the cause of overdose, identify specific substances, and respond effectively to mitigate public health risks.
- Rapid testing also helps track emerging synthetic cannabinoids and their impact on community health, inside and outside correctional facilities.

35

Conclusions

- The surge in synthetic cannabinoid use in US correctional facilities is a serious growing public health issue.
- A comprehensive system for detection, prevention, and access to reference standards is needed to avoid overdose incidents.
- Reducing the inflow of these drugs, identifying specific substances, and implementing strategies to enhance safety for inmates and staff is crucial for the well-being of those in correctional facilities, the community, and the public health.

36

ACKNOWLEDGMENTS

The authors want to thank the Cook County Sheriff's Office and the Cook County Jail Staff for the collaboration in this research.

37

THANK YOU FOR YOUR ATTENTION!

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THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

The Emergence of Bromazolam in Jefferson County AL. A Case Series.

Kesley D. Green, MD; Lisa M. Bianco, DO; Brandi C. McCleskey, MD; Karen S. Scott, PhD
University of Alabama at Birmingham, Department of Pathology

1

Disclosure

I disclose that I have no relevant financial relationships that create a conflict of interest related to the content of my presentation. There is no commercial support for this session. All opinions are my own.

2

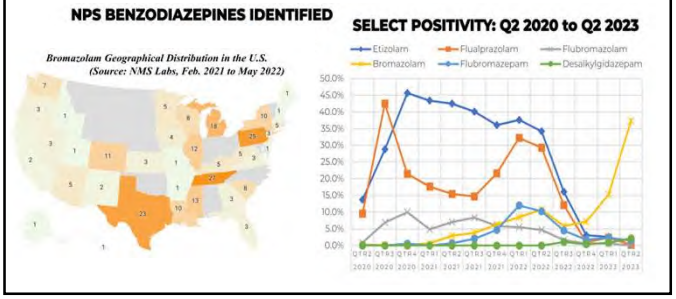
Introduction

- Postmortem toxicology evolves at a rapid pace which presents challenges for both toxicologists and medical examiners.
- Monitoring tools such as the Center for Forensic Science Research and Education (CFSRE) Novel Psychoactive Substances (NPS) Discovery highlight the trends of drugs within the United States.
- Benzodiazepine usage is transient, with specific drugs changing in popularity every few years.

3

Figure 1

Figure 1: The Center for Forensic Science Research and Education (CFSRE) Novel Psychoactive Substances (NPS) Discovery program's trend of benzodiazepines from quarter 2 of 2020 to 2023.



4

Introduction Continued

- Bromazolam
  - Designer benzodiazepine
  - Brominated analog of alprazolam
  - Bromazolam is a triazolo-benzodiazepine
- Bromazolam is a white crystalline substance found in tablet, capsule, powder, solution forms
- Synthesized in 1976 but was never approved for pharmaceutical use
- The current, unauthorized use of bromazolam is for its therapeutic qualities, such as sedation and muscle relaxation

5

Figure 2

Figure 2: The molecular structures of benzodiazepine, alprazolam, and bromazolam.

6

Introduction Continued

- There is a lack of available information in the scientific literature on bromazolam concentrations in fatal and non-fatal cases.
- The additive effects of bromazolam with fentanyl on CNS depression has not been studied in depth.
- As bromazolam is a potent benzodiazepine, low concentrations of this novel drug are likely to contribute to CNS depression in opioid overdose cases.
- This case series depicts 6 cases of accidental deaths caused by drug toxicity from July 2022 through March 2023, where at least one of the inciting drugs was bromazolam.

7

Materials and Methods

- Toxicology specimens from the Jefferson County Coroner/Medical Examiner Office (JCCMEO) to the University of Alabama at Birmingham's Forensic Toxicology Laboratory in June 2022 until March 2023 were collected
- A Siemens Viva Jr ® EMIT is used to screen urine samples
- An Agilent 7820A GC/MS is used to confirm the presence of benzodiazepines in blood
- The corresponding autopsy records were gathered for data

8

Case Inclusion Criteria

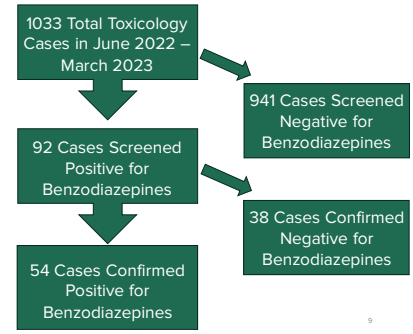


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Table 1

Table 1: Distribution of confirmed benzodiazepines samples in all toxicology cases from June 01, 2022 to March 31, 2023.

Benzodiazepine	Number of Confirmed Positive Samples (Percent)
7-aminoclonazepam (Metabolite of clonazepam)	1 (1.6%)
8-aminoclonazolam (Metabolite of clonazolam)	1 (1.6%)
Alprazolam	29 (45.3%)
Bromazolam	6 (9.4%)
Chlordiazepoxide	4 (6.3%)
Clonazepam	1 (1.6%)
Diazepam	7 (10.9%)
Midazolam	3 (4.7%)
Nordiazepam (Metabolite of chlordiazepoxide (n=3)/diazepam (n=6))	12 (18.8%)

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Cases

11

11

Case 1

- 35-year-old white female
- Unresponsive lying face up on a bedroom floor by her boyfriend
- Blood and a puncture mark was found on the left antecubital fossa
- A bent spoon with burn marks on the bottom laying on a nearby table
- The boyfriend stated that she had a history of Xanax and heroin abuse and a current Suboxone prescription; A medication log for trazadone was filled but not used
- Her boyfriend noted that she overdosed two months previously

12

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Case 2

- 25-year-old white male prisoner
- Unresponsive in his cell
- He was pronounced dead after being transported to the infirmary
- His cell showed no evidence of alcohol, illicit drugs or paraphernalia.
- No evidence of foul play or trauma
- Past medical history is significant for a prior overdose a month before his demise.

13

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Case 3

- 30-year-old white male
- Unresponsive on his side on the bathroom floor of his apartment
- His body showed decompositional changes
- Several syringes with needles, spoons with burn marks, small plastic bags containing unknown white substances, and several white pills believed to be Xanax on the floor near the decedent's body

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Case 3 Continued

- A syringe and needle was found in the decedent's left hand
- According to the decedent's father, the decedent did not have any medical problems
- However, he had been dealing with a drug addiction(meth and heroin) for the past decade of his life
- He was treated at rehabilitation facilities in the past

15

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Case 4

- 20-year-old white male
- Unresponsive in the back seat of a vehicle by his lifelong friend
- No obvious signs of trauma
- No evidence of illicit drugs found
- Per the friend's testimony, the decedent was believed to be using Xanax the night before he was found dead

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Case 5

- 20-year-old black male
- Unresponsive in his bedroom by his roommate
- No signs of struggle
- Various types of drug paraphernalia were in the decedent's room and adjacent to the decedent's location
- No illicit drugs seen

17

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Case 6

- 34-year-old white female
- Unresponsive in her place of residence by her husband
- Past medical history is significant for seizures, hiatal hernia, difficulty breathing
- No notable signs of trauma or foul play
- No signs of substance or alcohol abuse

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Results and Discussion

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Figure 4

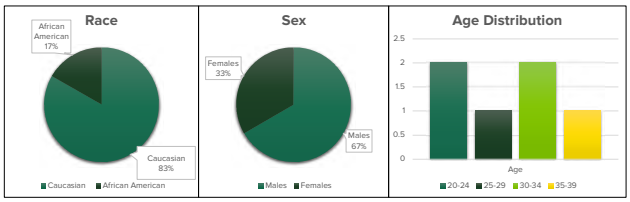

Figure 4: Demographics of the six cases positive for bromazolam

20

20

Table 2

Case	Age	Sex	Race	Cause of Death
1	35	Female	Caucasian	Fentanyl, methamphetamine, and bromazolam toxicity
2	25	Male	Caucasian	Fentanyl and bromazolam toxicity
3	30	Male	Caucasian	Acute methamphetamine intoxication
4	20	Male	Caucasian	Fentanyl and bromazolam toxicity
5	20	Male	African American	Fentanyl and bromazolam toxicity
6	34	Female	Caucasian	Bromazolam, methadone, and diphenhydramine toxicity

Table 2: Demographics and cause of death of the six cases testing positive for bromazolam.

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Table 3

Table 3: Summary of University of Alabama at Birmingham's Forensic Toxicology Laboratory results of the six cases testing positive for bromazolam.

Drug	Case Number					
	1	2	3	4	5	6
Bromazolam	0.040 mg/L	0.070 mg/L	0.108 mg/L	0.054 mg/L	0.046 mg/L	<0.025 mg/L
Fentanyl	0.012 mg/L	0.097 mg/L	0.006 mg/L	0.015 mg/L	0.008 mg/L	
Methamphetamine	0.368 mg/L		>1.0 mg/L			
Amphetamine			0.370 mg/L			
4-ANPP	Present	Present	Present	Present		
Ethanol			0.022 mg/L			
Oxycodone			0.025 mg/L			
Cocaine			<0.025 mg/L	<0.025 mg/L	<0.025 mg/L	
Morphine				0.002 mg/L		
Diphenhydramine				<0.025 mg/L		<0.260 mg/L
Methadone						2.44 mg/L
Codeine					<0.025 mg/L	
Lidocaine				Present		
Nicotine				Present	Present	
Cotinine				Present	Present	
Caffeine				Present	Present	Present
Ecgonine methyl ester					Present	
EDDP						Present

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Limitations of Study

- This case series is limited by the small case size.
  - Further documentation of accidental deaths involving bromazolam toxicity can help trend the degree of the possible emerging bromazolam epidemic.
  - Further documentation from other jurisdictions would also help increase the generalizability of the study results.
  - Screening for bromazolam usage in non-deceased individuals could help understand the effective dose versus lethal dose of bromazolam, especially if bromazolam was the sole drug used.

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Conclusion

- Post-mortem toxicology depicts an ever-changing pot-pourri of drugs that portrays many different trends.
- Benzodiazepines are a class of drugs that are often created de novo, rise, fall, and sometimes vanish all together.
- The recent emergence of bromazolam has not provided the opportunity to study its effects, potency, and lethality in depth.
- Capturing important emerging drug trends on the death certificate is critical to help inform public health and medical colleagues for preventive measures and treatment in the continued drug epidemic.

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Acknowledgements

- University of Alabama Department of Pathology
- Jefferson County Coroner/Medical Examiners Office

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THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Thank you!

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CFSRE's NPS Discovery – A No-Cost Resource for Tracking and Confirming the Presence of Novel Psychoactive Substances in Forensic Samples from Medicolegal Death Investigations

The National Association of Medical Examiners (NAME) 2023 Annual Meeting – October 15, 2023

Alex J. Krotulski[1*], Sara E. Walton[1], Donna M. Papsun[2], Melissa F. Fogarty[1], Joshua DeBord[1], Barry K. Logan[1,2]
[1]Center for Forensic Science Research and Education, Fredric Rieders Family Foundation, Willow Grove, PA, [2]NMS Labs, Horsham, PA

1

DISCLOSURES

- I have no conflicts of interest to disclose.
- I am a scientist and employee of FRFF / CFSRE, a 501(c)(3) non-profit research and educational facility.
- CFSRE's NPS Discovery program is funded in part by the National Institute of Justice (NIJ), Office of Justice Programs (OJP), U.S. Department of Justice (DOJ).
  - Award Number: 15PNIJ-22-GG-04434-MUMU
  - The opinions, findings, conclusions and/or recommendations expressed in this publication are those of the author(s) and do not necessarily represent the official position or policies of the U.S. Department of Justice.

NIJ | National Institute of Justice
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BACKGROUND

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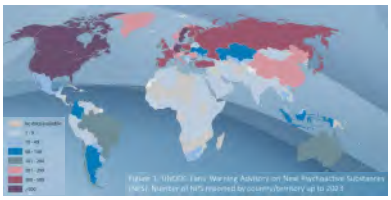
WHAT ARE "NPS"?

- **Novel (or new) psychoactive substances (NPS) is a catch-all term that captures most drugs outside traditional and therapeutic categories, also referred to as "designer drugs"**
  - Newly synthesized or discovered
  - New to the drug supply
  - Used in a new way or manner
  - Altered toxicological effect profile
- **Five major subclasses of NPS**
  - Benzodiazepines
  - Opioids
  - Stimulants
  - Hallucinogens
  - Cannabinoids



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WHY ARE NPS POPULAR?

- **Consumers**
  - New highs / more desirable effects
  - Easier to source than tradition drugs
  - Legal status (or avoid illegal status)
  - Beat traditional drug tests
- **"Manufacturers" / Processers**
  - Cheaper alternatives
  - Desirable combined drug effects
  - Legal status (or avoid illegal status)
- **NPS are often unknown to consumer / processors**

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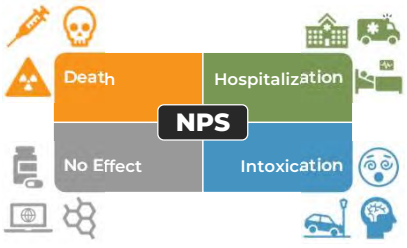
WHERE DO NPS APPEAR?



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6

DRUG EARLY WARNING SYSTEM

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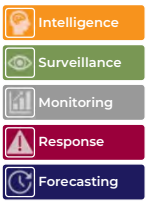
DRUG EARLY WARNING SYSTEM (EWS)

- Drug early warning systems are a multidisciplinary network with aims to exchange information, identify emerging drugs and changes in drug markets, and assess risks
  - Have become an integral part of public health efforts
  - Primary goal – reduce harms
  - Several EWS exist internationally
- In 2018, the CFSRE launched NPS Discovery
  - Open-access drug early warning system
  - Combine aspects of surveillance, casework, and research
  - Analyze samples and generate data in-house
  - Develop a panel of high impact reports
  - Disseminate results and reports widely to stakeholders



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COMPONENTS OF OUR DRUG EARLY WARNING SYSTEM

- **Access to sample populations & data sources**
  - Toxicology samples – forensic and clinical
  - Drug materials – various distribution points
  - Surveys and drug use information
  - Online sources – drug fora, gray market sites, etc.
- **Framework that defines drugs of interest**
  - NPS vs. traditional drugs vs. adulterants, etc.
- **Uniform reporting format and structure**
- **Research initiatives / research programs**

- **Dissemination avenues**
  - Scientific community
  - Public health and public safety
  - Drug consuming populations and general public
- **Scientific and health expertise**
  - Pharmacology
  - Toxicology
  - Medical treatment
- **Collaborations, cooperation, information sharing, and plan for action**
  - Drug control and scheduling actions

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FORENSIC LABORATORY

- The Center for Forensic Science Research and Education (CFSRE)
  - 501(c)(3) non-profit research and educational facility
  - *Surveillance & Casework*

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10

DATA AND TRENDS

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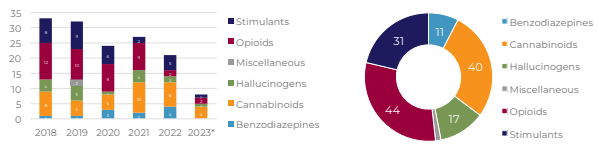
EMERGENCE OF NPS IN THE U.S.

- Since 2018, NPS Discovery has reported 145 newly discovered NPS (and counting)
- **NPS opioids** remain the largest subclass of newly emerging drugs encountered
- As of June 2023, NPS Discovery has reported 8 NPS for the first time this year



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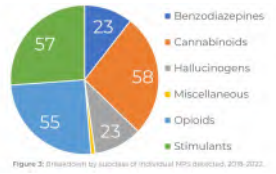
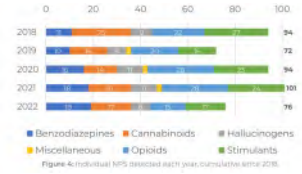
LANDSCAPE OF NPS IN THE U.S.

- Since 2018, NPS Discovery has identified more than 225 NPS in forensic samples
- NPS opioids, stimulants, and cannabinoids represent the largest subclasses observed





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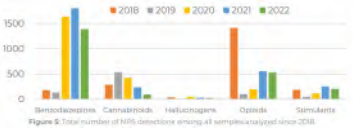
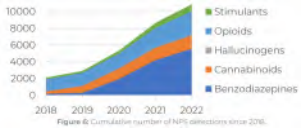
PROLIFERATION OF NPS IN THE U.S.

- In 2022, NPS Discovery observed more than 2,200 total NPS detections
- A portion of more than 10,000 total NPS detections since 2018





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MOST POPULAR NPS TODAY

BENZODIAZEPINES
- **Bromazolam**
- Desalkylgidazepam
- Flubromazepam
- [Etizolam & Flualprazolam]

OPIOIDS
- [*para*-Fluorofentanyl]
- Metonitazene
- ***N*-Pyrrolidino Protonitazene**
- *Other Nitazene Analogues*

STIMULANTS & HALLUCINOGENS
- ***N,N*-Dimethylpentylone**
- Alpha-PHP / Alpha-PiHP
- Eutylone
- Fluorexetamine (2F- and 3F- analogues)

CANNABINOIDS
- MDMB-4en-PINACA
- ADB-BINACA / ADB-BUTINACA
- [*Others vary greatly by time / location*]
- [*Excludes semi-synthetic cannabinoids*]

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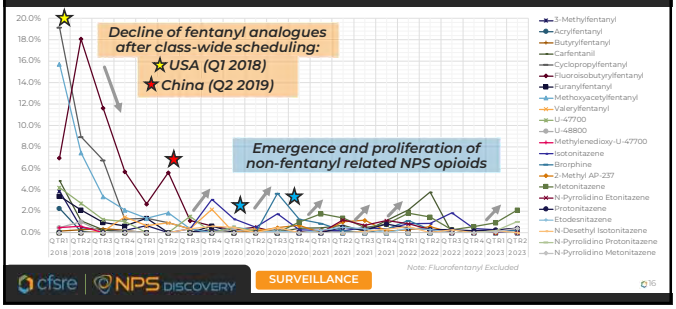
EFFECTS OF DRUG SCHEDULING (NATIONAL)



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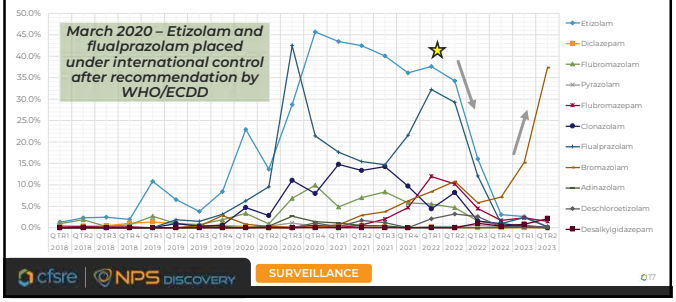
EFFECTS OF DRUG SCHEDULING (INTERNATIONAL)



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NOTABLE NPS COMBINATIONS & DISTRIBUTION

- **Fentanyl & Bromazolam** (>75%)
- **Nitazene Analogues & NPS Benzodiazepines**
  - Isotonitazene (89%, L), Metonitazene (94%, C), N-Pyrrolidino Etonitazene (89%, R), etc.
  - Variety of NPS benzodiazepines
- **Geographical distribution of cases involving nitazene analogues:**

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CASE EXAMPLES

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CASE #1

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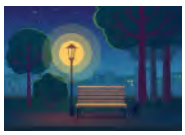
CASE #1

- Three individuals buy and use "cocaine"
- Become unresponsive and transported to hospital
  - One requires advanced life support – dies three days later



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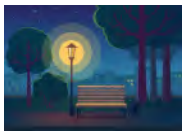
CASE #1

- Three individuals buy and use "cocaine"
- Become unresponsive and transported to hospital
  - One requires advanced life support – dies three days later
- **Toxicology testing:**
  - Hospital UDS: + amphetamine, + cocaine, + benzodiazepines
  - Forensic lab (urine): cocaine, methamphetamine, naloxone, fentanyl



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22

CASE #1

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  - Forensic lab (urine): cocaine, methamphetamine, naloxone, fentanyl
- **Further investigation required:**
  - Three powders submitted
  - Hospital blood and urine transferred

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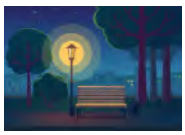
CASE #1

- Three individuals buy and use "cocaine"
- Become unresponsive and transported to hospital
  - One requires advanced life support – dies three days later
- **Toxicology testing:**
  - Hospital UDS: + amphetamine, + cocaine, + benzodiazepines
  - Forensic lab (urine): cocaine, methamphetamine, naloxone, fentanyl
- **Further investigation required:**
  - Three powders submitted
  - Hospital blood and urine transferred
- **Etodesnitazene – blood (72 ng/mL)**



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CASE #1

- **Case History:**
  - Three individuals ingested misrepresented "cocaine"
  - Two non-fatal overdoses, one fatal overdose
- **Drug Material Testing:**
  - Powder #3 → Etodesnitazene
- **Toxicology Testing:**
  - Blood & Urine → Etodesnitazene
- **Death Certification:**
  - Manner of Death – Accident
  - Cause of Death – Acute Etodesnitazene Intoxication

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CASE #2

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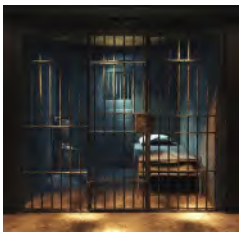
CASE #2

- In-custody death – found unresponsive in cell
  - Location known for drug use
- Decedent found slumped forward on toilet
  - Pronounced dead



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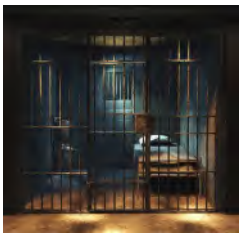
CASE #2

- In-custody death – found unresponsive in cell
  - Location known for drug use
- Decedent found slumped forward on toilet
  - Pronounced dead
- **Toxicology testing:**
  - Forensic lab: caffeine, naloxone and carbamazepine



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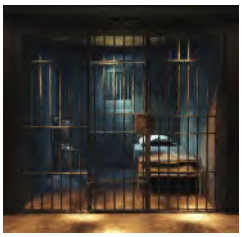
CASE #2

- In-custody death – found unresponsive in cell
  - Location known for drug use
- Decedent found slumped forward on toilet
  - Pronounced dead
- **Toxicology testing:**
  - Forensic lab: caffeine, naloxone and carbamazepine
- **Further investigation required:**
  - Blood transferred
- **Synthetic cannabinoid:**
  - MDMB-4en-PINACA and metabolite



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CASE #3

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CASE #3

- Individual found deceased at residence
- Drug paraphernalia found on scene
  - White oval shaped "IP204" pill

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CASE #3

- Individual found deceased at residence
- Drug paraphernalia found on scene
  - White oval shaped "IP204" pill
- **Autopsy** → pulmonary edema, frothy foam

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CASE #3

- Individual found deceased at residence
- Drug paraphernalia found on scene
  - White oval shaped "IP204" pill
- **Autopsy** → pulmonary edema, frothy foam
- **Toxicology testing:**
  - Forensic lab: oxycodone (41 ng/mL), acetaminophen, THC-COOH

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CASE #3

- Individual found deceased at residence
- Drug paraphernalia found on scene
  - White oval shaped "IP204" pill
- **Autopsy** → pulmonary edema, frothy foam
- **Toxicology testing:**
  - Forensic lab: oxycodone (41 ng/mL), acetaminophen, THC-COOH
- **Further investigation required:**
  - Pills submitted
  - Blood and urine transferred

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CASE #3

TOXICOLOGY RESULTS

- **LC-QQQ-MS (Blood):**
  - *N*-Desethyl Isotonitazene – 5.0 ng/mL
  - Bromazolam – Positive (<5.0 ng/mL)
  - Oxycodone – Positive *(@ 41 ng/mL)*
  - Acetaminophen – Positive
- **LC-QQQ-MS (Urine):**
  - *N*-Desethyl Isotonitazene – 1.7 ng/mL
  - Bromazolam – Positive (<5.0 ng/mL)
  - Oxycodone – Positive
  - Noroxycodone – Positive
  - Acetaminophen – Positive

CHEMISTRY RESULTS

- **GC-MS (Pills):**
  - *N*-Desethyl Isotonitazene – Positive
  - Bromazolam – Identified
  - Acetaminophen – Positive
  - *[Counterfeit oxycodone tablets]*

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CASE #3

TOXICOLOGY RESULTS

- **LC-QQQ-MS (Blood):**
  - *N*-Desethyl Isotonitazene – 5.0 ng/mL
  - Bromazolam – Positive (<5.0 ng/mL)
  - Oxycodone – Positive *(@ 41 ng/mL)*
  - Acetaminophen – Positive
- **LC-QQQ-MS (Urine):**
  - *N*-Desethyl Isotonitazene – 1.7 ng/mL
  - Bromazolam – Positive (<5.0 ng/mL)
  - Oxycodone – Positive
  - Noroxycodone – Positive
  - Acetaminophen – Positive

CHEMISTRY RESULTS

- **GC-MS (Pills):**
  - *N*-Desethyl Isotonitazene – Positive
  - Bromazolam – Identified
  - Acetaminophen – Positive
  - *[Counterfeit oxycodone tablets]*

DEATH CERTIFICATION

- **Manner of Death:**
  - Accident
- **Cause of Death:**
  - Probable mixed drug intoxication

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NO-COST FORENSIC RESOURCE

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NO-COST FORENSIC TESTING

- CFSRE's NPS Discovery is funded by the **National Institute of Justice (NIJ) / Department of Justice (DOJ)** to assist medical examiner, coroners, toxicology labs, and other forensic agencies
  - Goal: Identify, confirm, and quantify (if necessary) the presence of emerging drugs in samples of interest
  - Scope: Toxicology samples (blood, urine, etc.) and drug materials (pills, powders, etc.)
  - ***Generally, not the first toxicology lab testing sample(s)

- **When to send samples to NPS Discovery:**
  - Signs point to opioid death but toxicology testing is negative
  - Drugs / paraphernalia found on scene, toxicology negative, NPS suggested
  - Naloxone administered but no opioids or drugs of interest detected

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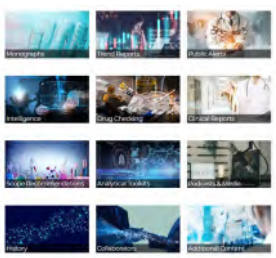
WEBSITE ▸ WWW.NPSDISCOVERY.ORG



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CONCLUSIONS

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CONCLUSIONS

- **NPS continue to appear** in fatal overdose scenarios and in forensic samples and toxicology specimens
  - NPS as the cause of death / culprit for overdose
  - Polydrug cases with NPS alongside other drugs
  - NPS may be "along for the ride" (alternative MOD and/or COD)
- Extent of NPS impacts remains **unknown** and **under-reported**
- **Misrepresentation** and **adulteration** continue for NPS in North America, especially NPS opioids
  - Nitazene analogues sold as "dope", "heroin", or "fentanyl"
  - NPS added to fentanyl (e.g., increase potency of product)

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ACKNOWLEDGEMENTS

- **CFSRE Team**
  - Barry Logan
  - MJ Menendez
  - Sara Walton
  - Josh DeBord
  - Mandi Mohr
  - Melissa Fogarty
  - Alyssa Reyes
  - Brianna Stang
  - Alexis Quinter
  - Max Denn
  - Many others!
- **NMS Labs**
  - Donna Papsun
- **Funding Agencies**
  - NIJ, CDC, NIH, etc.
- **Collaborators & Partners**
  - Forensic
  - Clinical
  - Medical Examiners
  - Coroners
  - Crime Labs
  - Etc.

NIJ | National Institute of Justice
STRENGTHEN SCIENCE. ADVANCE JUSTICE.

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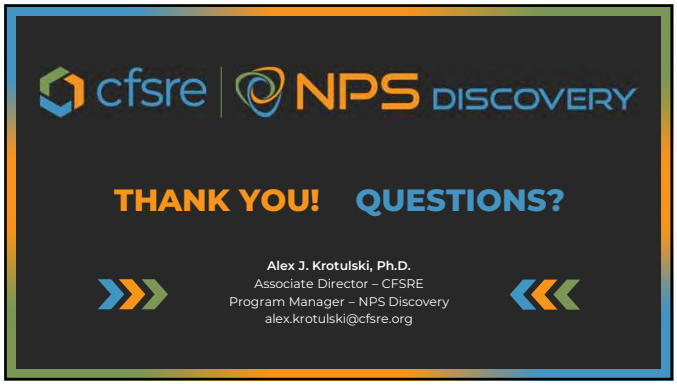
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THANK YOU! QUESTIONS?
Alex J. Krotulski, Ph.D.
Associate Director – CFSRE
Program Manager – NPS Discovery
alex.krotulski@cfsre.org

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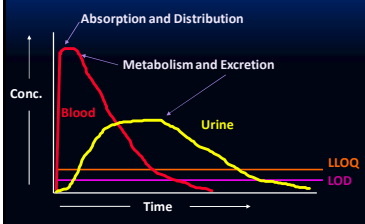
The Vanishing Zero – Do Trace Amounts Matter?

Laura M. Labay, PhD, F-ABFT, DABCC-TC

1

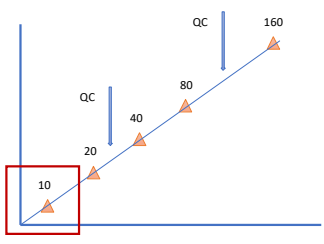
LOD and LLOQ from a PK Perspective

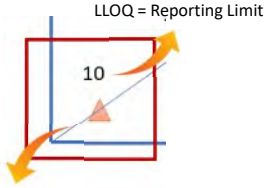


LLOQ CONSIDERATIONS
- MATRIX TYPE
- PHARMACOKINETIC PROPERTIES
- TEST PURPOSE
  - TDM
  - Workplace
  - DFC
  - Postmortem
- TEST MANDATES
  - SAMHSA

2

LOD and LLOQ from an Analytical Perspective





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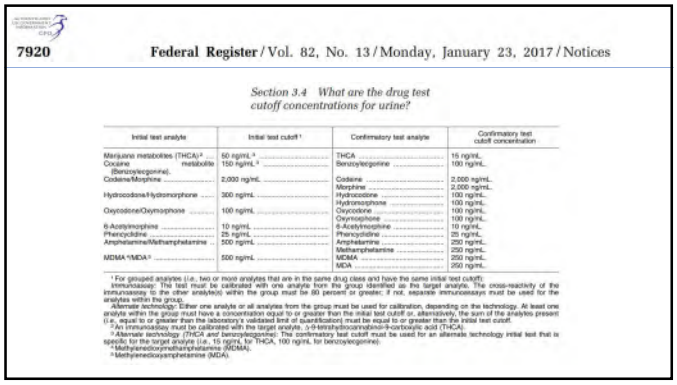


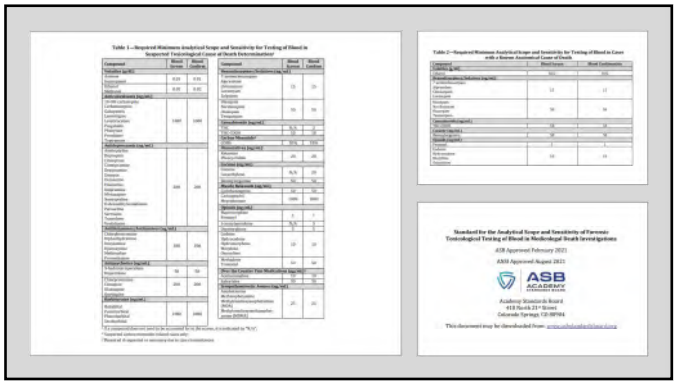
7920 Federal Register / Vol. 82, No. 13 / Monday, January 23, 2017 / Notices

Section 3.4 What are the drug test cutoff concentrations for urine?

Initial test analyte	Initial test cutoff [1]	Confirmatory test analyte	Confirmatory test cutoff concentration
Marijuana metabolites (THCA) [2]	50 ng/mL [3]	THCA	15 ng/mL.
Cocaine metabolite (Benzoylecgonine).	150 ng/mL [3]	Benzoylecgonine	100 ng/mL.
Codeine/Morphine	2,000 ng/mL	Codeine	2,000 ng/mL.
		Morphine	2,000 ng/mL.
Hydrocodone/Hydromorphone	300 ng/mL	Hydrocodone	100 ng/mL.
		Hydromorphone	100 ng/mL.
Oxycodone/Oxymorphone	100 ng/mL	Oxycodone	100 ng/mL.
		Oxymorphone	100 ng/mL.
6-Acetylmorphine	10 ng/mL	6-Acetylmorphine	10 ng/mL.
Phencyclidine	25 ng/mL	Phencyclidine	25 ng/mL.
Amphetamine/Methamphetamine	500 ng/mL	Amphetamine	250 ng/mL.
		Methamphetamine	250 ng/mL.
MDMA [4]/MDA [5]	500 ng/mL	MDMA	250 ng/mL.
		MDA	250 ng/mL.

[1] For grouped analytes (i.e., two or more analytes that are in the same drug class and have the same initial test cutoff):
Immunoassay: This test must be calibrated with one analyte from the group identified as the target analyte. The cross-reactivity of the immunoassay to the other analyte(s) within the group must be 80 percent or greater. If not, separate immunoassays must be used for the analytes within the group.
Alternate technology: Either one analyte or all analytes from the group must be used for calibration, depending on the technology. At least one analyte within the group must have a concentration equal to or greater than the initial test cutoff or, alternatively, the sum of the analytes present (i.e., equal to or greater than the laboratory's validated limit of quantification) must be equal to or greater than the initial test cutoff.
[2] An immunoassay must be calibrated with the target analyte, 11-9-tetrahydrocannabinol-9-carboxylic acid (THCA).
[3] Alternate technology (THCA *and* benzoylecgonine): The confirmatory test cutoff must be used for an alternate technology initial test that is specific for the target analyte (i.e., 15 ng/mL for THCA, 100 ng/mL for benzoylecgonine).
[4] Methylenedioxymethamphetamine (MDMA).
[5] Methylenedioxyamphetamine (MDA).

4



5

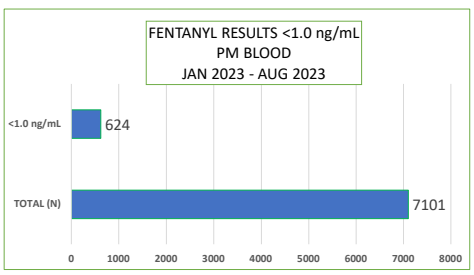
Is there an interpretive impact to strictly adhering to consensus standards or administratively set reporting limits?

Do extremely low concentrations matter?

6

THE OTHER 8.8%

Opioids (ng/mL)	screen	confirmation
Buprenorphine Fentanyl	1	1



7

CASE EXAMPLE 1

- 27 YR FEMALE
- Found deceased following request for a welfare check at a motel.
- COD: Opiate Toxicity
- Murder in 3rd degree charge

Compound	Result	Units	Matrix Source
Caffeine	Positive	mcg/mL	001 - Femoral Blood
Cotinine	Positive	ng/mL	001 - Femoral Blood
Nicotine	Positive	ng/mL	001 - Femoral Blood
Morphine - Free	7.5	ng/mL	001 - Femoral Blood
11-Hydroxy Delta-9 THC	1.7	ng/mL	001 - Femoral Blood
Delta-9 Carboxy THC	22	ng/mL	001 - Femoral Blood
Delta-9 THC	3.0	ng/mL	001 - Femoral Blood
Fentanyl	0.69	ng/mL	001 - Femoral Blood

8

CASE EXAMPLE 1

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- Found deceased following request for a welfare check at a motel.
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- Murder in 3rd degree charge

Opioids (ng/mL)	screen	confirmation
Buprenorphine Fentanyl	1	1
6-acetylmorphine	N/A	5
Oxymorphone	5	5
Codeine Hydrocodone Hydromorphone Morphine Oxycodone	10	10

Compound	Result	Units	Matrix Source
Caffeine	Positive	mcg/mL	001 - Femoral Blood
Cotinine	Positive	ng/mL	001 - Femoral Blood
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Delta-9 Carboxy THC	22	ng/mL	001 - Femoral Blood
Delta-9 THC	3.0	ng/mL	001 - Femoral Blood
		ng/mL	001 - Femoral Blood

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CASE EXAMPLE 2

OPINION:

This 3 week old male infant, Michael Allen Webster, Jr., died of complications of unsafe sleeping environment. The presence of methamphetamine within the postmortem blood contributed to death.

The manner of death is accident.

CAUSE OF DEATH: Complications of unsafe sleeping environment.

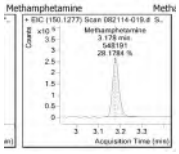
OTHER SIGNIFICANT CONTRIBUTING DISORDER: Presence of methamphetamine (trace) within postmortem blood.

MANNER OF DEATH: Accident.

Webster v. State, NO. 09-18-00391-CR | Casetext Search + Citator

Quantitation Results

Compound	RT	RT Diff.	Response	Conc. (%)	Mass Acc. (ppm)
Cotinine	2.242	0.014	249328	5.4	0.93
Amphetamine	3.165	0.002	78420	13.2	-11.93
Methamphetamine	3.178	0.002	548101	28.21	8.58
Caffeine	3.356	0.005	394782	3.5	9.01



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CASE EXAMPLE 2

screen confirmation

Sympathomimetic Amines (ng/mL)		
Amphetamine Methamphetamine Methylenedioxyamphetamine (MDA) Methylenedioxymethamphetamine (MDMA)	25	25

Please repeat amphetamines panel confirmation testing by LC-MS/MS on sample 003 (peripheral blood). Let the testing department know that low level concentrations of methamphetamine and amphetamine were indicated by the TOF Screen. Because of this, a negative matrix control needs to be placed in the sequence immediately prior to this sample.

× 5 =

Compound	Result	Units	Matrix Source
Methamphetamine	< 5.0	ng/mL	002 - Central Blood
Methamphetamine	< 5.0	ng/mL	003 - Peripheral Blood
Creatinine (Vitreous Fluid)	0.38	mg/dL	004 - Vitreous Fluid
Sodium (Vitreous Fluid)	132	mmol/L	004 - Vitreous Fluid
Potassium (Vitreous Fluid)	13	mmol/L	004 - Vitreous Fluid
Chloride (Vitreous Fluid)	117	mmol/L	004 - Vitreous Fluid
Urea Nitrogen (Vitreous Fluid)	10	mg/dL	004 - Vitreous Fluid

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CASE EXAMPLE 3

- 8 yr. old female abducted from mobile home complex.
- Body was located 10 days later in an irrigation pond.
- As part of the death investigation toxicology testing was performed.

MATRIX	RESULTS
Brain	Ethanol: 183 mg/100 g Beta-phenethylamine: Positive
Liver	Ethanol: 46 mg/100 g Isopropanol: 76 mg/100 g Beta-phenethylamine: Positive

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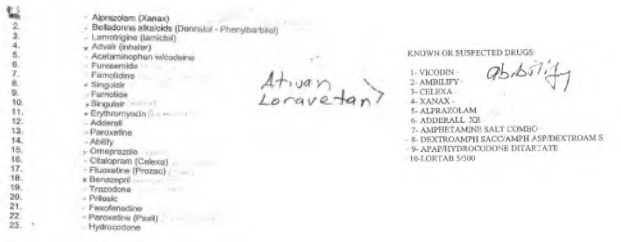
CASE EXAMPLE 3 – SUSPECTED DRUG LIST

Allegation that victim was drugged prior to sexual assault and death. Was she drugged?



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CASE EXAMPLE 3

- Directed benzodiazepine testing performed by LC-MS/MS.
- Trace concentration of alprazolam (Xanax®) indicated in brain and liver by LC-MS/MS.
- Testing developed to achieve LLOQ of 0.25 ng/mL.

Compound	Blood Screen	Blood Confirm
Benzodiazepines/Sedatives (ng/mL)		
7-aminoclonazepam Alprazolam Clonazepam Lorazepam Zolpidem	15	15
Diazepam Nordiazepam Oxazepam Temazepam	50	50

MATRIX	FINAL RESULTS
Brain	Ethanol: 183 mg/100 g Beta-phenethylamine: Positive **Alprazolam: 6.6 ng/g**
Liver	Ethanol: 46 mg/100 g Isopropanol: 76 mg/100 g Beta-phenethylamine: Positive **Alprazolam: 1.5 ng/g**
Gastric Fluid	**Alprazolam: 18 ng/mL**

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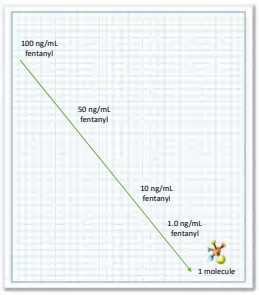
POINTS TO CONSIDER

- Laboratories must ensure analytical tests include relevant analytes at appropriate sensitivities.
- To provide guidance, scientific working groups have developed consensus standards.
- When interpreting toxicology results, it is important to recognize that reporting limits do not necessarily equate to the lowest concentrations that can be differentiated from blank matrix.
- Is there an interpretive impact to strictly adhering to consensus standards or administratively set reporting limits?
  - *Maybe, depending upon the circumstances of the case.*
- LLOQs = the vanishing zero



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UNIVERSITY of MARYLAND SCHOOL OF MEDICINE

Cognitive Bias in Forensic Pathology: What We Can Learn from Aversive Racism Research

Lo Tamburro, MD – PGY2 (they/them)
Department of Pathology
University of Maryland School of Medicine

1

Outline

1. Define cognitive bias and examine its impact in forensics and medicine more broadly
2. Clarify what we should be researching
3. Define aversive racism
4. Identify which cases are at greatest risk of bias
5. Explore interventions upheld by aversive racism research

3

What is Cognitive Bias?

- Natural processes that develop due to the mind's need to seek out patterns and develop heuristics to navigate complex stimuli more quickly[13]
  - Can unconsciously lead to inaccurate judgments or interpretations[13]

Image: https://mediate.com/top-ten-cognitive-biases-and-distortions-in-mediation/

4

The Problem

- We keep doing research on if cognitive bias impacts forensic pathologists
- Returning to this question is just reinventing the wheel
- We already have the answer to this question

6

Why is this Wrong?

- Medicine has broadly acknowledged the impact of bias in medical decision-making
  - 1999 report "To Err is Human"[5]
  - More than 100 biases affect clinical decision making[6]
  - Cognitive biases outpace knowledge deficits as causes of medical error[7]
  - Many medical disciplines now acknowledge the influence of cognitive bias on our thinking[6]

7

Forensic Sciences are not Immune

- Studies focused mainly on latent fingerprint analysis
  - Also seen in fields like DNA mixtures, forensic anthropology, bloodstain pattern analysis, dog handling, bullet toolmark analysis, etc.[8]
- Forensic science experts are influenced by task-irrelevant contextual information:
  - Detective's opinion, a suspect's confession, or forensic evidence from other domains.[9]

8

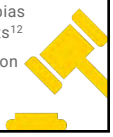
Why Research is Needed

- Forensic experts have limited appreciation of cognitive bias and see themselves as impervious to it[9]
  - Survey of > 400 forensic experts: respondents believed their judgments to be nearly infallible, with 37% self-reporting a 100% accuracy rate[9]
  - Suggesting a "bias blind spot," "overconfidence effect,"[9,10] or "fallacy of "expert immunity"[11]

9

Why Research is Needed

- There are large legal and ethical stakes of not minimizing the impact of bias on FP decisions[10]
- Jurors cannot recognize and disregard forensic opinions impacted by cognitive bias[12]
  - Jurors trust examiners who claim to be impervious to bias more than those who acknowledge its potential impacts[12]
  - Jurors are the final decision-makers, so FP determination standards need to be higher[13]



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Biases exist ubiquitously

11

What Should we be Asking?

- What debiasing strategies are effective in forensic pathology?
- We must move past studies proving bias exists and push for research about its causes and interventions instead
- To help kickstart this work, aversive racism research can be looked to for guidance

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Linear Sequential Unmasking

- Popularly proposed intervention, linear sequential unmasking (LSU), is ill-suited to forensic pathology
- Task-irrelevant contextual information does not necessarily lead to inaccurate decision-making[10]
- Consider instead:
  - Which cases are at greatest risk of bias
  - Which interventions best decrease bias without info blinding

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What is Aversive Racism?

- Racial biases emerge as **unconscious** and **rationalizable** discrimination in those that otherwise maintain a self-perception of being egalitarian, non-racist, and unbiased
- Commonly seen when situations or objectives are ambiguous
  - When presented with "a situation in which the normatively appropriate response is clear, aversive racists will not discriminate"[14]

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What is Aversive Racism?

- **Consciously**:
  - Support principles of racial equity and view themselves as non-prejudiced[15]
- **Unconsciously:**
  - Possess negative feelings / beliefs about Black people
    - Rooted in normal socio-cognitive processes (social dominance and ingroup-outgroup categorization)[14,15]
- **Rationalizable**:
  - Seek nonracial explanations for their biased behavior to preserve a nonprejudiced self-image[15]

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Applying Aversive Racism Framework

- The roots of aversive racism (social dominance and ingroup-outgroup categorization) are at the core of cognitive biases
  - When the biasing factor is race, cognitive bias and aversive racism are just two sides of the same coin
- Applicable beyond racial bias to the behaviors of dominant groups toward systemically marginalized group
- Aversive racism framework can guide future research to mitigate impacts of cognitive bias in FP

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Which cases are at greatest risk of bias?

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Ambiguous Cases

- Ambiguity → Increased cognitive bias / aversive racism
  - Increased ambiguity means:
    - Range of plausible situation interpretations expands
    - Personal discretion of the examiner increases
    - Rationalization of actions as being made based on factors other than the biasing component increases

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Which Cases are Ambiguous?

- Research must be done to make clear what types of cases are ambiguous
  - Suspicious death of a child[16,17]
  - In-custody deaths and police-involved shooting deaths[13]
- How to test:
  - Inclusion of complexity modifiers in analysis of results[8]
- Knowing this can help narrow the case pool that future research and subsequent interventions need to be applied to

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Criminal Cases

- Cases with criminal element have greatest stakes[13]
- Cases headed toward criminal proceedings are already triaged when determining jurisdiction
  - This triage could be used to funnel cases into different treatments with regards to bias reduction[13]
- Most cases will only see the public health arm of FP, not the medicolegal one
  - Of criminal cases, ~ 1 in 400 are ambiguous[13]
  - Most of the time examiners would not be burdened by additional bias mitigation steps

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Which interventions best decrease bias?

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Interventions

- **View as individual vs member of an outgroup**
  - Perspective-taking and empathic responding[14]
  - Increasing exposure to counter stereotypic members of a group one holds bias towards[14]
- **Activating egalitarian goals**
  - Replace stereotypic associations with egalitarian ones[14]
- **Harness egalitarian motives**
  - Induce guilt upon making people aware of their biases → compensatory behavior[14]

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Interventions

- **Accountability Reminder**
  - Reminding examiners of their personal accountability for detecting and correcting for unconscious bias[14]
- **Common ingroup identity model**
  - Members of different groups think of themselves as a single superordinate ingroup rather than as two separate groups[14]
- **Priming creativity**
  - Causes people to avoid leaning on heuristics[18]

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Key Points

- Tenets of aversive racism are applicable to cognitive bias
- Research is needed to:
  - Identify ambiguous cases that future research and subsequent interventions need to be applied to
  - Identify which interventions are most beneficial and ecologically valid for FP
- NAME must come to consensus and endorse standardized procedures to mitigate cognitive bias for all offices to follow

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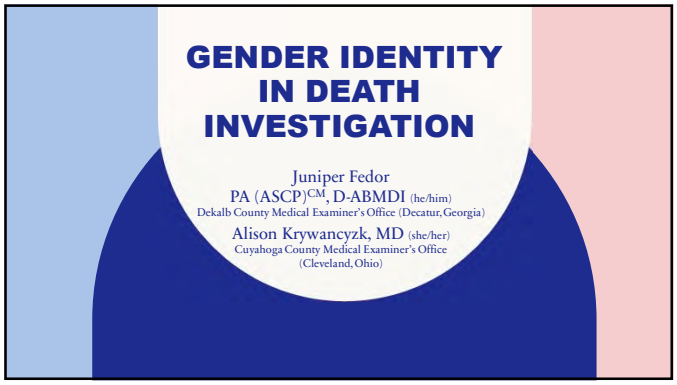
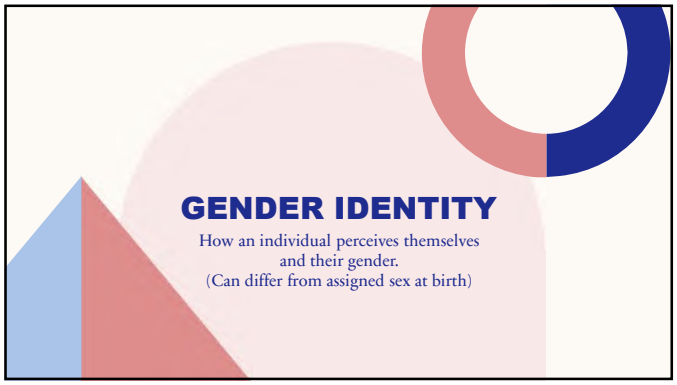
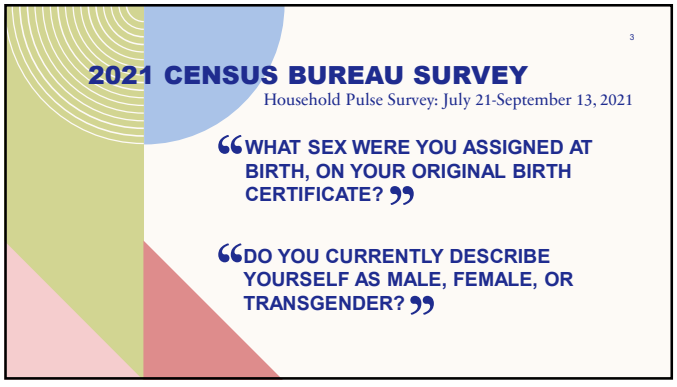

GENDER IDENTITY IN DEATH INVESTIGATION
Juniper Fedor
PA (ASCP)CM, D-ABMDI (he/him)
Dekalb County Medical Examiner's Office (Decatur, Georgia)
Alison Krywancyzk, MD (she/her)
Cuyahoga County Medical Examiner's Office
(Cleveland, Ohio)

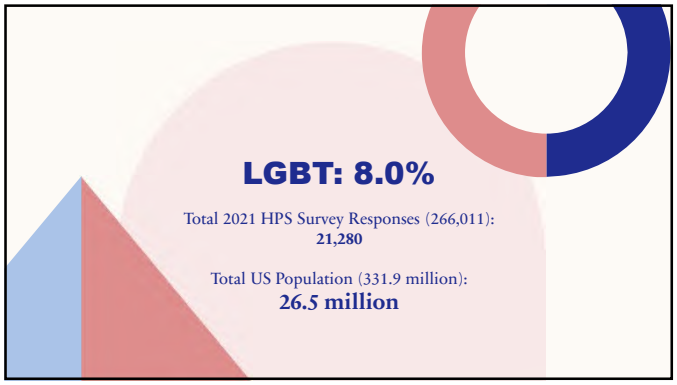
1


GENDER IDENTITY
How an individual perceives themselves and their gender.
(Can differ from assigned sex at birth)

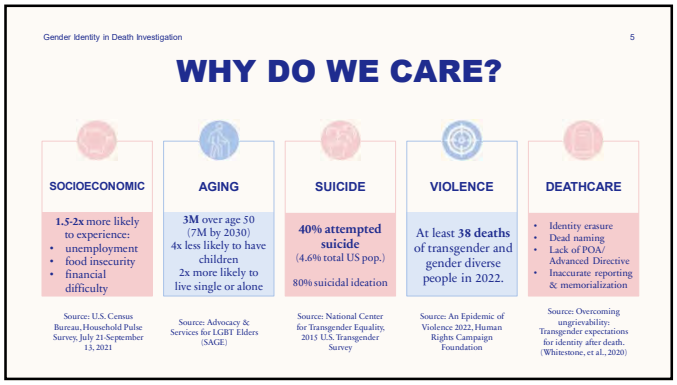
2


3
2021 CENSUS BUREAU SURVEY
Household Pulse Survey: July 21-September 13, 2021
"WHAT SEX WERE YOU ASSIGNED AT BIRTH, ON YOUR ORIGINAL BIRTH CERTIFICATE?"
"DO YOU CURRENTLY DESCRIBE YOURSELF AS MALE, FEMALE, OR TRANSGENDER?"

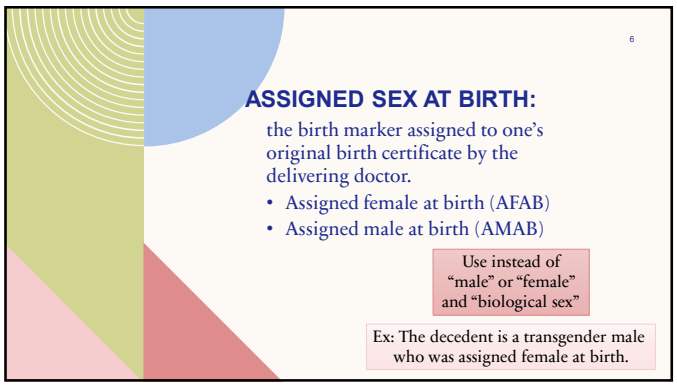
3


LGBT: 8.0%
Total 2021 HPS Survey Responses (266,011):
21,280
Total US Population (331.9 million):
26.5 million

4


Gender Identity in Death Investigation
5
WHY DO WE CARE?
SOCIOECONOMIC
1.5-2x more likely to experience:
• unemployment
• food insecurity
• financial difficulty
Source: U.S. Census Bureau, Household Pulse Survey, July 21-September 13, 2021
AGING
3M over age 50 (7M by 2030)
4x less likely to have children
2x more likely to live single or alone
Source: Advocacy & Services for LGBT Elders (SAGE)
SUICIDE
40% attempted suicide (4.6% total US pop.)
80% suicidal ideation
Source: National Center for Transgender Equality, 2015 U.S. Transgender Survey
VIOLENCE
At least 38 deaths of transgender and gender diverse people in 2022.
Source: An Epidemic of Violence 2022, Human Rights Campaign Foundation
DEATHCARE
• Identity erasure
• Dead naming
• Lack of POA/ Advanced Directive
• Inaccurate reporting & memorialization
Source: Overcoming ungrievability: Transgender expectations for identity after death. (Whitestone, et al., 2020)

5


6
ASSIGNED SEX AT BIRTH:
the birth marker assigned to one's original birth certificate by the delivering doctor.
• Assigned female at birth (AFAB)
• Assigned male at birth (AMAB)
Use instead of "male" or "female" and "biological sex"
Ex: The decedent is a transgender male who was assigned female at birth.

6

7

TRANSGENDER:

Someone whose gender identity is different from their assigned sex at birth.

- Transgender male = Male identity
- Transgender female = Female identity
- "Trans" is a shortened form that can be used casually.

Outdated Terminology:
Transvestite
Transexual

7

8

NONBINARY:

An umbrella term for an individual who does not identify as either male or female, and/or self-identifies outside of the gender binary.

- Shortened to NB or enby/enbee.
- Some NBs identify as trans, some do not.

NB Identities:
Genderqueer
Genderfluid
Gender non-conforming
Agender
Two-Spirit

Image: https://asch.org/breaking-out-of-the-gender-binary-box/

8

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INTERSEX:

An individual with differences in sex traits or reproductive anatomy compared to the usual two ways human bodies develop (male or female)

- At birth or developed
- Differences in genitalia, hormones, internal anatomy, or chromosomes.

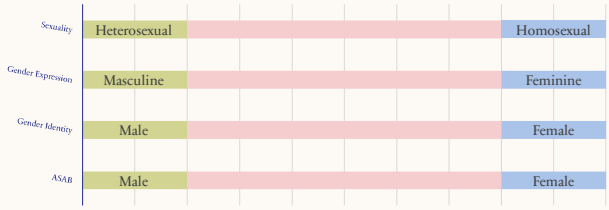
Fun Fact:
An estimated **1.7%** of the population has traits that align with being intersex.

Around **2%** of the population has red hair.

Outdated Terminology:
Hermaphrodite
Disorder of Sex Development (DSD)

9

RECOGNIZING THE SPECTRUM



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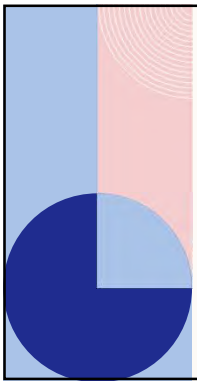
APPROACHES TO INVESTIGATION



SCENE MARKERS

- Incongruence in government ID or medical records
  - 68% gender diverse individuals without updated identification (USTS)
- Androgynous/clothing expressive of the opposite of the phenotypic gender.
  - Cross-dressing ≠ Transgender
- Lack of contact with family, strong connection with "found" family.
- Various stages of gender-affirming care.

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GENDER AFFIRMING CARE:

Care received by a gender diverse individual to feel more physically or mentally aligned with their gender identity.

- Hormone Replacement Therapy (HRT)
- Gender affirming surgeries:
  - Top surgery (breast augmentation, double mastectomy)
  - Bottom surgery (phalloplasty, vaginoplasty)
  - Facial feminization, rhinoplasty
- Gender therapy, vocal training, etc.

Outdated Terminology:
Sex change surgery
Sex reassignment surgery

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APPROACHES TO INVESTIGATION

13

INTERVIEWS

- Speaking with "found family" can be invaluable.
- Families that deny trans/gender diverse status
  - Be gentle, but respectful.
  - Utilize neutral words: they/them, "your child", etc.
- Ask about social and mental health history.
- Ask the "hard questions"!
  - "Did your child ever talk about their gender identity or sexuality?"
  - "Did they ever go by a different name or nickname?"
  - "What pronouns did the decedent use?"

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ACCURATE REPORTING AND DOCUMENTATION

14

DATABASES

- NamUs, NVDRS, SUDORS
- Legal vs. Chosen Name
- Must include accurate description of clothing/scars/tattoos
- Many databases do not have gender identity data
  - If an "other" or previous identity is unknown, identification under one identity is unlikely.

DEATH CERTIFICATES

- DC sex marker information is filled in by funeral director.
- Most states recommend the DC matches the birth certificate.
  - **Many transgender people have a corrected form of ID and birth certificate!**
- Some states passed legislation for gender identity to be included or considered on DCs
  - "X" gender marker on DC for nonbinary, intersex, and others

Gender Identity in Death Investigation

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Gender Identity in Death Investigation

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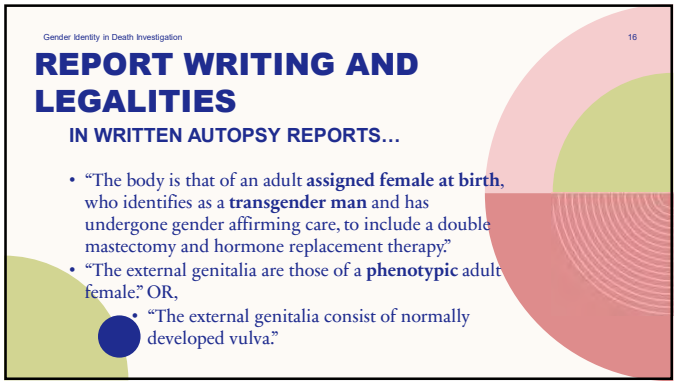
REPORT WRITING AND LEGALITIES

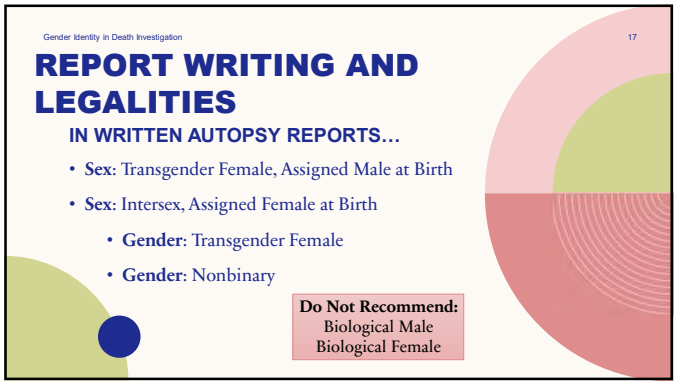
IN WRITTEN INVESTIGATIVE REPORTS…

- "…reported the death of [**LEGAL NAME**], who identified as **nonbinary** and was **assigned male at birth**. The decedent used the name [**CHOSEN NAME**] and the pronouns they/them,
  - which will be utilized in reference to the decedent through the remainder of this report."

15


Gender Identity in Death Investigation
16
REPORT WRITING AND LEGALITIES
IN WRITTEN AUTOPSY REPORTS…
• "The body is that of an adult **assigned female at birth**, who identifies as a **transgender man** and has undergone gender affirming care, to include a double mastectomy and hormone replacement therapy."
• "The external genitalia are those of a **phenotypic** adult female." OR,
• "The external genitalia consist of normally developed vulva."

16


Gender Identity in Death Investigation
17
REPORT WRITING AND LEGALITIES
IN WRITTEN AUTOPSY REPORTS…
• **Sex**: Transgender Female, Assigned Male at Birth
• **Sex**: Intersex, Assigned Female at Birth
• **Gender**: Transgender Female
• **Gender**: Nonbinary
Do Not Recommend:
Biological Male
Biological Female

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Gender Identity in Death Investigation
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TRANS DOE TASKFORCE
• Nonprofit organization
• Helps in identifying trans or gender diverse UID cases.
• Trans-led forensic genetic genealogy team
LAAMP DATABASE
• LGBTQ+ Accountability for Missing and Murdered Persons
• Focus on cases that require LGBTQIA+ support and other marginalized groups
• Access can be requested by MDIs
• **www.transdoetaskforce.org**

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THANK YOU

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MEDICAL EXAMINER REVIEW OF INMATE PRISON DEATHS AND PARTNERSHIP OPPORTUNITY TO DECREASE INMATE MORTALITY

Theodore T. Brown, MD,[1,2] Teddi L. Tubre, MD,[1,2] and Shelly Byers[3]

Arkansas State Crime Laboratory, Department of Public Safety,[1] University of Arkansas for Medical Sciences,[2] and Arkansas Department of Corrections[3]

Little Rock, Arkansas

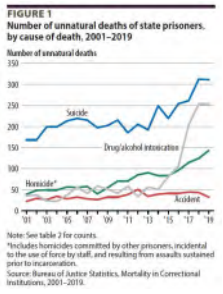
1

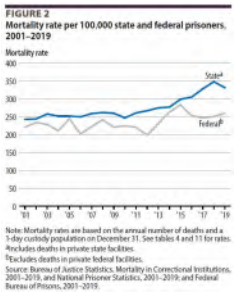
OUTLINE

- Discussion of deaths in correctional institutions
- Three-year review of inmate deaths within the Arkansas prison system (2020 to 2022)
- Proposed forensic pathologist participation in prison inmate mortality review teams

2

MORTALITY IN STATE AND FEDERAL PRISONS





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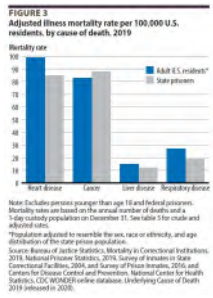
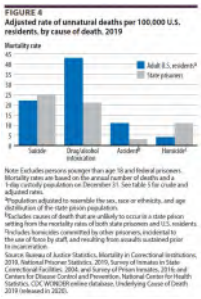
MORTALITY IN STATE AND FEDERAL PRISONS





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ARKANSAS PRISON SYSTEM INMATE DEATHS

- All deaths that occurred while the person was in custody of a local, state, or federal institution are referred to the Arkansas State Crime Laboratory

5

2020 PRISON INMATE DEATHS

- 122 total deaths
  - 105 Natural (51 COVID-19-Related Deaths)
  - 4 Accident
    - COD: 3 Drug Overdoses and 1 Choking on Foreign Body
  - 10 Suicide
    - COD: 10 Ligature Hangings
  - 2 Homicide
    - COD: 1 Multiple Stab Wounds and 1 Head Trauma
  - 1 Undetermined

6

2020 PRISON INMATE NON-NATURAL DEATHS

- Sex
  - Accident: 4 Males
  - Suicide: 10 Males
  - Homicide: 2 Males
- Race
  - Accident: 3 White and 1 Black
  - Suicide: 4 White, 5 Black, and 1 Hispanic
  - Homicide: 1 White and 1 Black
- Mean Age
  - Accident: 54 years (range: 50 years to 73 years)
  - Suicide: 33 years (range: 25 years to 53 years)
  - Homicide: 58.5 years (range: 58 years to 59 years)
- Mean Days as Prisoner until Death
  - Accident: 3,370 days (range: 69 days to 7,713 days)
  - Suicide: 1,843 days (range: 45 days to 4,907 days)
  - Homicide: 5,172 days (range: 2,935 days to 7,409 days)

7

2021 PRISON INMATE DEATHS

- 68 total deaths
  - 54 Natural (0 COVID-19-Related Deaths)
  - 2 Accident
    - COD: 1 Drug Overdose and 1 Complications of Fall
  - 9 Suicide
    - COD: 9 Ligature Hangings
  - 2 Homicide
    - COD: 1 Complications of Right Femur Fracture and 1 Head Trauma
  - 1 Undetermined

8

2021 PRISON INMATE NON-NATURAL DEATHS

- Sex
  - Accident: 2 Males
  - Suicide: 8 Males and 1 Female
  - Homicide: 2 Males
- Race
  - Accident: 2 White
  - Suicide: 4 White and 5 Black
  - Homicide: 2 White
- Mean Age
  - Accident: 71 years (range: 67 years to 74 years)
  - Suicide: 36 years (range: 27 years to 46 years)
  - Homicide: 59 years (range: 55 years to 62 years)
- Mean Days as Prisoner until Death
  - Accident: 6,174 days (range: 1,780 days to 10,567 days)
  - Suicide: 2,535 days (range: 50 days to 8,333 days)
  - Homicide: 12,304 days (range: 11,579 days to 13,028 days)

9

2022 PRISON INMATE DEATHS

- 63 total deaths
  - 45 Natural (1 COVID-19-Related Death)
  - 5 Accident
    - COD: 3 Drug Overdoses, 1 Environmental Hyperthermia, and 1 Blunt Head Trauma
  - 10 Suicide
    - COD: 9 Ligature Hangings and 1 Drug Overdose
  - 2 Homicide
    - COD: 2 Strangulations
  - 1 Undetermined

10

2022 PRISON INMATE NON-NATURAL DEATHS

- Sex
  - Accident: 5 Males
  - Suicide: 10 Males
  - Homicide: 2 Males
- Race
  - Accident: 5 White
  - Suicide: 7 White and 3 Black
  - Homicide: 1 White and 1 Black
- Mean Age
  - Accident: 48.2 years (range: 36 years to 63 years)
  - Suicide: 38.2 years (range: 28 years to 50 years)
  - Homicide: 43 years (range: 24 years to 62 years)
- Mean Days as Prisoner until Death
  - Accident: 4,107 days (range: 191 days to 12,164 days)
  - Suicide: 3216 days (range: 195 days to 7,711 days)
  - Homicide: 276 days (range: 203 days to 349 days)

11

PRISON INMATE LIGATURE HANGING SUICIDES

- Of the suicide deaths, 97% were due to ligature hanging.
- The most common ligature was a bedsheet (75%), followed by clothing (11%), shoelace (7%), drawstring (3.5%) and laundry bag (3.5%).
- All ligature hangings occurred when the inmate was alone, almost always in single-person units.
- The mean number of days inmates hanged themselves after admission to the ADC was 2,615 days.

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PRISON INMATE MORTALITY REVIEW TEAMS

- Partnership with medical services administrator with the Arkansas Department of Corrections
- Database with information:
  - Name of Prisoner
  - Primary Offense
  - Admission to Arkansas Department of Corrections
  - DOB, Age, Race, Sex
  - Unit/Location found unresponsive
  - Unit/Location pronounced dead
  - Date and Time of Death
  - Cause and Manner of Death
  - Mortality Review

13

PRISON INMATE MORTALITY REVIEW TEAMS

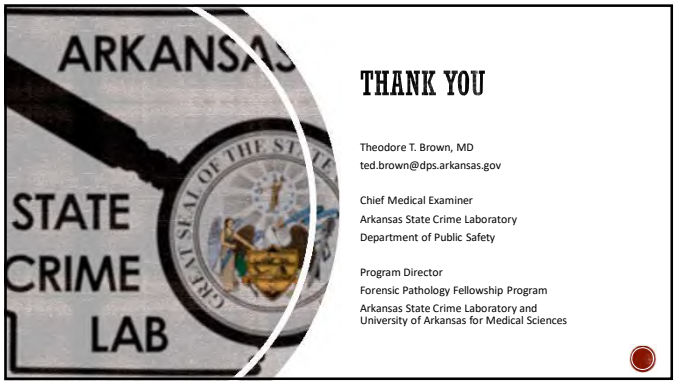
- Mortality review completed within 30 days after death
  - Participants
  - Agenda
  - Opportunities

14

PRISON INMATE MORTALITY REVIEW TEAMS

- Target high risk mechanisms of death.
- Akin to child death and maternal mortality review teams, ADC officials hold a mortality review meeting within 30 days of a prison inmate death.
- Given forensic pathologists are positioned with a holistic view of the inmate's death, forensic pathologists are encouraged to participate in these mortality review meetings to help identify mechanisms to decrease mortality in state prisons.
- Potential opportunities identified here include modifications of housing amongst prison inmates, increased access to mental health services, utilizing more mattresses with built-in, non-destructible sheets, and decreasing in-cell fixtures that may be used in suspension.
- Partnership and collaboration.

15


ARKANSAS
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CRIME
LAB
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6.5 Forensic Pathology of the Canadian Arctic Region

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Disclosure

The authors have no financial interests or relationships to disclose concerning material discussed in this presentation.

Background

Learning Objectives

By the end of the presentation, participants will be able to:

1. Identify the healthcare disparities faced by the Nunavut population and understand how these reflect higher rates of preventable mortality within the population.
2. Describe the trends in mortality within medicolegal autopsies referred from the territory of Nunavut.
3. Reflect on how this data can help guide culturally-appropriate public health interventions.

Nunavut – Where in the World?

Nunavut = 'Our Land'

- Largest and northernmost territory in Canada, formed in 1999
  - Inuit homeland (85% population)
- Covers one-fifth of Canadian land
  - Population ~40,500
  - 25 widely dispersed communities without road connection

Nunavut

- Healthcare delivery is the costliest in Canada (2.3x national average) and within the circumpolar world

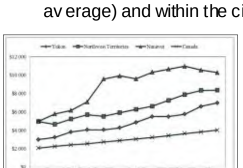


Figure 2.4. Trend in public sector per capita health expenditures in Canada and its three territories, 1999-2010. Source: CIHI (2011a).

Table III Health system comparisons and outcomes

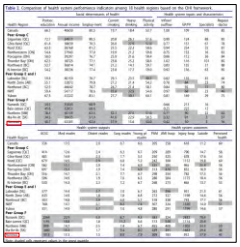
Country	Health system	Health expenditure per capita per annum (USD)	Life expectancy
Greenland	Universal healthcare	$ 3,530 (2008)	68 years (2008/WHO)
Alaska	Federal Indian Health Service complemented by public and private insurance	$ 6,450 (2004)* National $4,671	69.4 years (Alaskan Natives/2000 Census)
Canada**	Universal healthcare complemented by limited private funding	Northwest Territories $ 6,023 (CAD – 2005–2009) Nunavut $ 11,801 (CAD – 2005–2009) National $ 4,915 (CAD – 2005–2009)	Inuvialuit: 70.3 years** Nunavut: 69.2 years*** All Inuit regions: 66.9 years** National: 79.5 years***
Russia	Free medical care funded through insurance, OOP and personal payments	National $ 866 (2008)	National: 61 years (2008) Inuit: 58.6 (00–04)

Table II Same-time comparative health indicators for Inuit and national populations

Indicator (2000–2004)	USA	Alaska natives	Canada	Nunavut	Denmark	Greenland	Russia	C'kotka
Life expectancy at birth	M 74.6 F 80.0	M 68.1 75.4	M 77.2 F 82.2	M 66.6 F 70.0	M 74.9 F 79.6	M 63.7 F 70.0	M 58.8 F 72.1	M 53.6 F 63.7
Infant mortality/1,000 live births	6.9	10.8	5.3	15.3	4.7	12.1	13.3	20.3

Source: Circumpolar Health Indicators: Sources, Data and Maps; T Kue Young; Circumpolar Health Supplements, 2008.

Nunavut



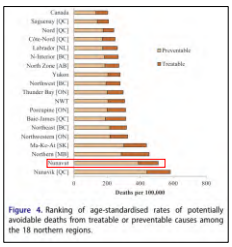


Figure 4. Ranking of age-standardised rates of potentially avoidable deaths from treatable or preventable causes among the 18 northern regions.

Nunavut

Table 3. Density of health professionals (per 100,000) in North America.

	2000–2004	Ratio	2005–2009	Ratio	2010–2014[a]	Ratio
Physicians						
USA	280	1.00	289	1.00	299	1.00
Alaska	230	0.82	248	0.86	255	0.85
Canada	189	1.00	195	1.00	216	1.00
Yukon	171	0.91	218	1.12	194	0.90
Northwest Territories	107	0.57	107	0.55	89	0.41
Nunavut	29	0.15	36	0.19	36	0.17

Figure 2. Density of practicing physicians (per 100,000) in eight Arctic States and their northern regions.

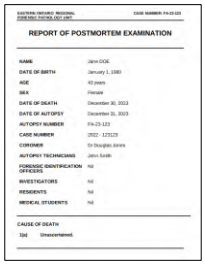
Nunavut

Medicolegal Death Investigation

- Lay coroner system (*Coroner's Act)*
  - Administered by the Department of Justice and under the supervision of the Chief Coroner
- No forensic pathologists in the territory
  - Bodies transported to southern facilities for postmortem examination
    - Eastern Ontario Regional Forensic Pathology Unit (Ottawa)
    - Office of the Chief Medical Examiner of Manitoba (Winnipeg)
    - Office of the Chief Medical Examiner of Alberta (Edmonton)

Methodology

Methodology



REPORT OF POSTMORTEM EXAMINATION

NAME	Jane DOE
DATE OF BIRTH	January 1, 1980
AGE	43 years
SEX	Female
DATE OF DEATH	December 30, 2023
DATE OF AUTOPSY	December 31, 2023
AUTOPSY NUMBER	FA-23-123
CASE NUMBER	2022 - 123123
CORONER	Dr Douglas Jones
AUTOPSY TECHNICIANS	John Keith
FORENSIC IDENTIFICATION OFFICERS	Nil
INVESTIGATORS	Nil
RESIDENTS	Nil
MEDICAL STUDENTS	Nil

CAUSE OF DEATH

1(a) Unascertained.

Retrospective analysis of all medicolegal autopsies referred to EOR FPU from Nunavut between 2012-2022

Sources of information:

- Report of Postmortem Examination
- Coroner's Warrant
- +/- Ancillary Test Results (Toxicology, Biochemistry, Microbiology)

Results

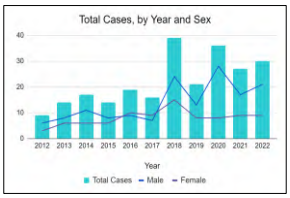
Results

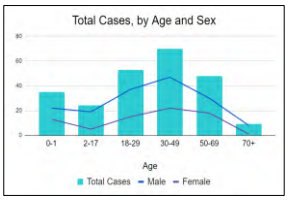
Year	Population*	Deaths*	Mortality Rate (per 100,000)	ML Autopsies at EORPFU	% Deaths Investigated
2012	34,192	166	485	9	5.42
2013	34,672	181	522	14	7.73
2014	35,337	173	490	17	9.83
2015	36,488	167	458	14	8.38
2016	36,975	186	503	19	10.21
2017	37,546	171	455	16	9.36
2018	38,143	176	461	39	22.16
2019	38,592	228	591	21	9.21
2020	39,157	206	526	36	17.48
2021	39,711	177	446	27	15.25
2022	40,526	175	432	30	17.14

*Statistics Canada

Total = 242

Results

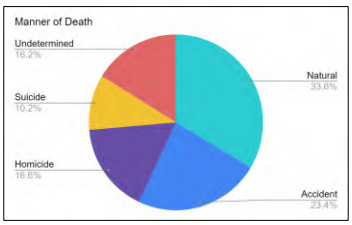




Male: 62.8%
Female: 37.2%

Range: 0-83 years
Mean: 32.5 years
Median: 30 years

Results



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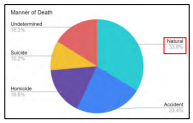
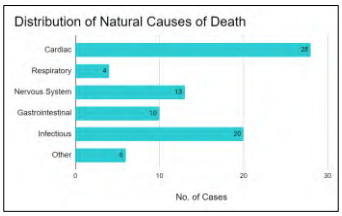
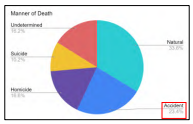




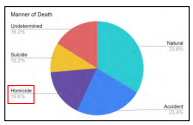
Results



Cause of Death	Cases (%)
Environmental	24 (43.6)
Hypothermia	10 (18.2)
Drowning	8 (14.5)
Fire-Related	6 (10.9)
Toxicologic	17 (30.9)
Ethanol	11 (20.0)
Mixed	3 (5.5)
Prescription	2 (3.6)
Other *	1 (1.8)
Blunt Force Injury	10 (18.2)
Asphyxia	3 (5.5)
Mechanical	2 (3.6)
Choking	1 (1.8)
Other **	1 (1.8)

* Propane toxicity
** Combined toxicologic and blunt force

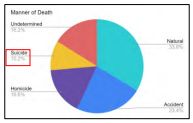
Results

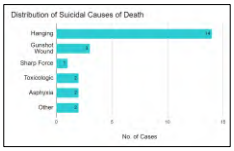


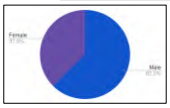
Cause of Death	Cases (%)
Gunshot Wounds	12 (30.8)
Sharp Force Trauma	17 (43.6)
Blunt Force Trauma	6 (15.4)
Neck Compression	3 (7.7)
Other *	1 (2.6)

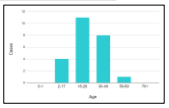
* Combined sharp and blunt force trauma

Results

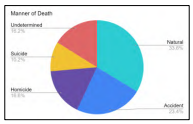








Results



Of the deaths under one year of age:

- 6 deaths were natural (17.6%)
- 1 death was accidental – toxicologic (2.9%)
- 27 deaths were undetermined (79.4%)
  - Of these, 25 (92.6%) were positive for an **unsafe sleeping environment** (bed-sharing, age-inappropriate sleep surface)

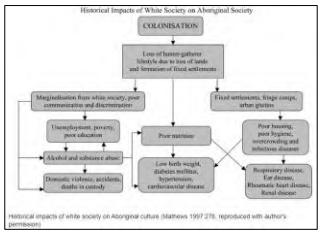
Discussion

Discussion

This retrospective describes population-specific indicators of morbidity and mortality within the Nunavut population

- Important trends which can be addressed through culturally-sensitive public health intervention strategies include:
  - Early recognition and escalation of care for infectious diseases
  - High rates of suicide among young males
  - High morbidity from ethanol abuse (acute and chronic use)
  - Prevalence of unsafe sleeping environments for newborns

Discussion



Conclusion

There is an increasing awareness of the health disparities facing Canada's Inuit population

- Scarcity of health and social science literature

Population-based research can help guide targeted public health interv ention strategies

- Important to *engage* Indigenous communities and to foster research models *born from* Indigenous perspectives
- Promote and fund opportunities for training of Indigenous indiv iduals within healthcare and forensic pathology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Where Science and Innovation meet Compassionate Care

Exploring Trauma, Stress, and Resilience in Medical Examiner/Coroner Contexts: Results of the First Phase of a Mixed Methods Study

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1

The research conducted and presented herein, in addition to the ongoing trajectory of this research, represents the work and collaboration of the N.A.M.E. Workplace Stress & Wellness Committee

2

Project Aims

- Identify factors associated with workplace wellness
- Measure the presence of detrimental variables in our workforce
- Collect and analyze objective and subjective data
- Compare/Contrast findings against contemporary models
- Develop and implement protective interventions
- Boost workforce retention and wellness

3

Project Design

- Multi-site
- Digital collection
- Anonymous respondents
- Quantitative & Qualitative Data
  - Survey responses
  - Open-form responses

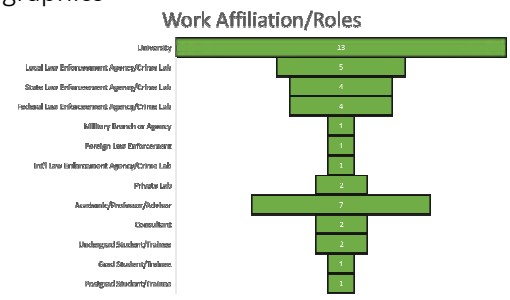
4

Demographics

Years of Service	Forensic Context	Death Investigations
0-2 years	18	12
3-5 years	14	17
6-10 years	10	11
11-15 years	8	6
16-20 years	5	4
21-25 years	4	6
26-30 years	1	2
31-35 years	0	1
36-40 years	0	0
41-45 years	0	2
46-50 years	0	0
Not applicable	1	1
Missing	1	1

5

Demographics



6

Emotional Exhaustion

	+ Response	- Response	Qualification
Feeling emotionally drained	26.9%	73.1%	*Majority fatigue*
Feeling used up at the end of the workday	23.8%	76.2%	*Majority fatigue*
Feeling fatigued upon waking/having to face another day	38.1%	61.9%	*Majority fatigue*
Working with people all day is a strain	58.7%	41.3%	*Some interpersonal strain*
Feeling burned out from work	47.6%	52.4%	*neutral*
Frustrated by my job	39.7%	60.3%	*Some work frustration*
I am working too hard	38.1%	61.9%	*Some overwork*
Working with people puts too much stress on me	71%	29%	*Few stressed by recipients*
I feel exhilarated working with recipients	60.7	39.3%	*Majority exhausted*

7

Cynicism

	+ Response	- Response	Qualification
I treat some recipients as impersonal objects	72.5%	27.5%	*Some depersonalization*
I have become more callous toward people	67.7%	32.3%	*Some depersonalization*
I worry this job is hardening me emotionally	58%	42%	*Some emotional change*
I don't really care what happens to some recipients	83.9%	16.1%	*Slight lack of concern*
I feel recipients blame me for some of their problems	71%	29%	*Some victimization*

8

Personal Accomplishment

	+ Response	- Response	Qualification
I can easily understand how recipients feel about things	80.3%	19.7%	*Majority empathic*
I deal very effectively with my recipient's problems	92%	8%	*Majority can handle direct duties*
I am positively influencing other people's lives	85.7%	14.3%	*Slight concern for value lost*
I feel very energetic	74.6%	25.4%	*Some enthusiasm lost*
I can easily create a relaxed atmosphere with recipients	82.3%	17.7%	*Majority can handle direct duties*
I have accomplished many worthwhile things in this job	87.3%	12.7%	*Slight loss of focus/goal*
I feel like I'm at the end of my rope	74.2%	25.8%	*Some exasperation*
In my work, deal with emotional problems very calmly	96.8%	3.2%	*Slight emotional dysregulation*

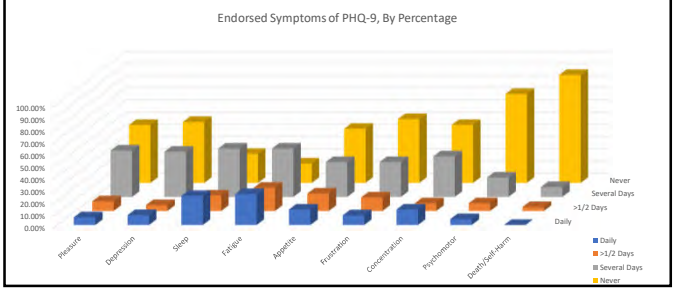
9

Concerns for Adverse Mood Factors

	NEVER	SEVERAL DAYS	MORE THAN HALF DAYS	NEARLY EVERY DAY
Loss of interest in pleasurable activities	47.6%	38.1%	7.9%	6.3%
Feelings of depression or hopelessness	50%	37.1%	4.8%	8.1%
Problems/Changes in sleeping pattern	23.8%	39.7%	12.7%	23.8%
Physical fatigue/loss of energy	15.9%	39.7%	19%	25.4%
Changes in appetite and/or eating patterns	44.4%	28.6%	14.3%	12.7%
Feelings of personal frustration, self-deprecation, letting others down	52.4%	28.6%	11.1%	7.9%
Difficulty concentrating/focusing	47.6%	33.3%	6.3%	12.7%
Psychomotor changes (dramatic loss of motivation to move or increase in fidgeting)	73%	15.9%	6.3%	4.8%
Thoughts of death or self-harm	88.7%	8.1%	3.2%	--
*How difficulty have these problems made it for you to do your work, care for things at home, or get along with others?	47.5%	37.7%	8.2%	6.6%

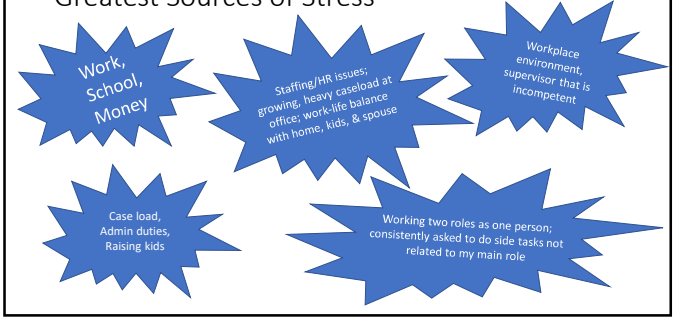
10

Concerns for Adverse Mood Factors



11

Greatest Sources of Stress



12

Where Does It Come From?

- Work – 466
- Personal Stressors – 62
- Impact of Work on Personal Life – 8

- TASK-RELATED STRESSORS
  - Types of Cases
    - Children; domestic homicide; abuse; suicide; Covid-19 cases
  - Specific Tasks
    - Dealing with grieving families; storing high number of bodies (with administrative pressure to release them); being asked to perform tasks not related to assigned roles; administrative work; dealing with operations considered "not professional or within scope"; phone call volume that monopolizes time; challenges related to not being able to release information

13

Appreciating Stress

	NEVER	ALMOST NEVER	SOMETIMES	FAIRLY OFTEN	VERY OFTEN
Been upset because of unexpected events	12.7%	20.6%	49.2%	15.9%	1.6%
Felt unable to control important things in your life	23.8%	20.6%	38.1%	6.3%	11.1%
Felt nervous or stressed	7.9%	15.9%	25.4%	27%	23.8%
Felt confident about ability to handle personal problems	3.2%	6.3%	23.8%	38.1%	28.6%
Felt things were going your way	3.3%	16.4%	41%	16.4%	23%
Found you could not cope with all that you had to accomplish	30.2%	22.2%	28.6%	11.1%	7.9%
Been able to control irritations	0%	9.5%	38.1%	30.2%	22.2%
Felt "on top of things"	3.2%	14.5%	32.3%	30.6%	19.4%
Angered because of things outside of your control	6.3%	25.4%	38.1%	23.8%	6.3%
Felt difficulties were piling up so high they could not be overcome	20.6%	31.7%	23.8%	15.9%	7.9%

14

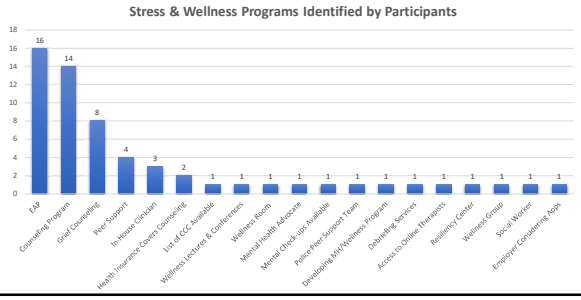
What Are They Saying?

- "[My] children and friends can tell when I have had no time for decompressing. I get edgy and very short with answers. Defensive and I just want to be alone. My anxiety is huge and breathing gets tight even with the little stuff. I decompress in the dark and quiet on my couch for a few hours."

- "I am not the happy/bubbly/naïve person I once was. I have gotten more quiet and introverted over the years (I used to be very extroverted). My sense of humor is 'off' from working in the morgue environment. Outside people usually don't understand my humor and I am often misunderstood because no one outside of work can comprehend my life experiences or relate to them. I often feel very alone."

15

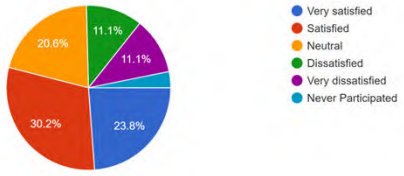
What Are We Doing About It?



16

Current Interventions

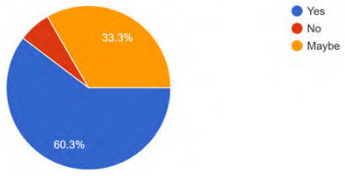
Overall, please select how satisfied you are with the support you receive from your employer.
63 responses



17

Future Needs & Directions

Would you like to see a wider variety of mental health and stress relief programs provided to those working within the context of a medical examiner's office?
63 responses



18

19

The Utility of Wellness Programs in Medical Examiner and Coroner Offices

From the NAME Workplace Stress & Wellness Committee

Heather S. Jarrell, MD[1], Amanda O. Fisher-Hubbard, MD[2], Michelle A. Jorden, MD[3], Meghan Clark[4], and Laura D. Knight[5], MD

[1] Chief Medical Investigator, New Mexico Office of the Medical Investigator, Associate Professor, University of New Mexico Health Sciences Center, Albuquerque, NM

[2] Assistant Professor, Department of Pathology, Division Chief, Division of Neuropathology, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI

[3] Chief Medical Examiner-Coroner, County of Santa Clara, Medical Examiner-Coroner Office, San Jose, CA

[4] Chief of Administration and Program Manager for the Family Advocate Support Team, Denver Office of the Medical Examiner, Denver, CO

[5] Chief Medical Examiner & Coroner, Washoe County Regional Medical Examiner's Office, Reno, NV, Associate Professor, Pathology & Pediatrics Departments, University of Nevada-Reno School of Medicine, Reno, NV

1

Do Medical Examiner/Coroner Offices Need Wellness Programs?

- While literature of burnout in medical examiner/coroner offices isn't robust, studies have reported burnout rates of 20% in employees
- Burnout rate of forensic pathologists is likely multifaceted:

"Well-being is the ability of individuals to address normal stresses, work productively, and realize one's highest potential."

2

Complex, Multifaceted Problem

- Additional research is being presented today in this session, helping us understand the scope of stressors and how widespread the problems are among our profession (FPs, MDIs, other staff)
- Other recent studies are beginning to address our issues as a profession:

Rineer J, et al. Work-Related Stress Among Medicolegal Death Investigator Professionals: Sources of Stress, Health Outcomes, and Protective Factors.
https://www.rti.org/impact/work-related-stress-among-medicolegal-death-investigators

3

Existing ME Office Wellness Programs - Common Elements

- Creating awareness of wellness / well-being as workplace concepts, risk for burnout and secondary (vicarious) trauma
- Cultivating office culture that values wellness and self-awareness over bravado/tough attitudes
- Providing new resources and education to employees
- Creating programs and activities to address employee needs
- Advocating for funding, staffing, etc resource needs for wellness program and for office in general
- Dogs

4

5

Reno, NV - Washoe County Regional Medical Examiner's Office

- **Multi-Pronged Program** Promoting Mental Health and Wellbeing
  - -Professional Support
  - -Peer Support
  - -Activities/Services
  - -Supportive Staffing and Scheduling Modalities
- **Wellness Team** - committee comprised of various levels in office for planning and implementing

6

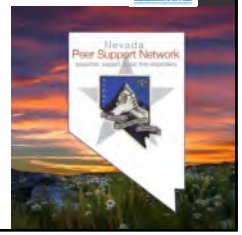
Professional Support

- Lectures/discussion sessions with *trauma-informed* therapists on topics such as secondary trauma, signs of burnout, and what to do about it
- Dedicated therapist on contract to provide individual counseling on as-needed basis, and regularly scheduled group sessions with staff
- CISM - Critical incident stress management, debriefings around major incidents

7

Peer Support

- Peer Support Program - select staff members receive training, provide peer level conversations and check-ins
- Peer Support Network provides inter-agency staffing for critical incident stress debriefings around major incidents, and other inter-agency support resources/training

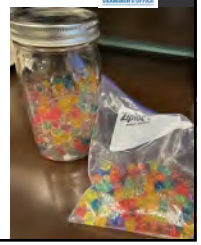


8

Other Activities/Services

Nervous system calming activities:

-Visiting therapy dogs
-Sensory beads
-Large coloring poster
-Online apps such as meditation or tapping
  - County purchased "Calm" for staff
-Live meditation instruction
-5 minute group yoga/stretch with online videos
-Creating a relaxation/decompression space in the office, indoor and outdoor options



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10

Other Activities/Services

- **Morale-building / team building group activities**
  -End of summer all-staff picnic
  -Participation in 5K runs, Dragon Boat rowing event, other sporting events
  -Pottery painting and craft nights
  -Docs' Happy Hour
  -Baby Goat Yoga, Paintball, Book Club, Karaoke…etc
- **Recognition Board**
- In-house **Wellness newsletter** with articles, podcast links, resources

11

Staffing and Scheduling

- Alternate scheduling opportunities such as 4 - 10's (all positions), with 3 consolidated days off (when possible)
- Telework option for positions amenable to it
- Rotating schedules that equitably distribute investigative graveyard/night or other "undesirable" shifts
- Cross-training of Medicolegal Death Investigators in both investigative and autopsy technician duties to provide work variety

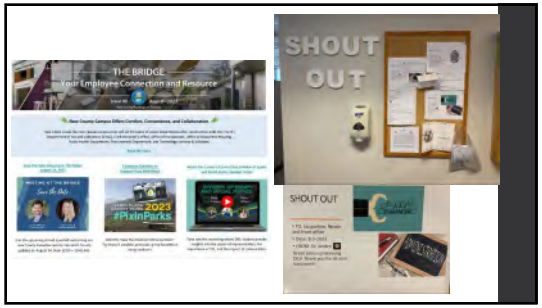
12

Santa Clara County, CA

Programs implemented to address burnout and well-being:

- Telework options
- Providing staff with acknowledgements for job well done (Shout out board)
- On-site workout room
- Chief ME disperses balance and wellbeing resources made available to all staff
- Health and wellness program provided to all employees free of charge
  - awards and prizes

13



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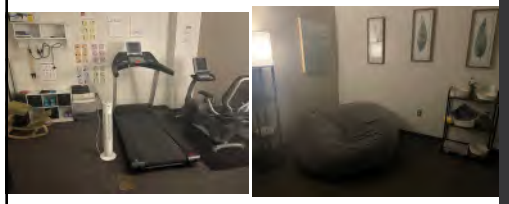
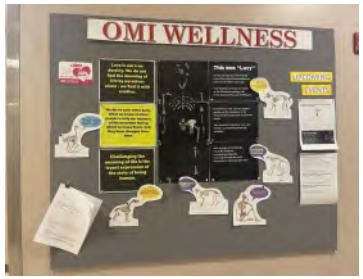
OFFICE OF THE MEDICAL INVESTIGATOR



Wellness Room

15

Wellness Board, located in main hallway of heavy traffic area



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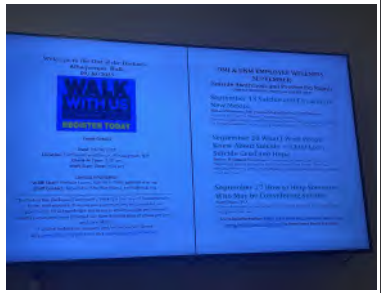
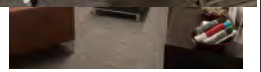
TV monitors: General announcement, recognition, Wellness events, other officewide communication



17

OMI Grief Services

- 2 Grief Counselors on-site, 1 grief couns specializing in children (The Grief Cente interns
- Funded by state appropriations, $320,0 annually, additional funding through VO of $99,000
- Main service includes grief outreach for decedent families
- Available for staff needs
- Organize wellness events for faculty and staff



18

OMI Grief Services Wellness Program Presents

Burning Bowl Release Ritual 2020

Letting go opens us to the power of inspiration, insight, wisdom, and love.

You will need:

Pen and Paper Matches or a Lighter
A Burn-Friendly Surface
(coffee can; ceramic, metal, or glass plate/bowl; fireplace, etc.)

OCTOBER
21st **WEDNESDAY 6PM – 7PM**

Please RSVP to Bri Van Schuyver (OMI Grief Services Intern) at bvanschuyver@salud.unm.edu by Monday, October 19th.
This event will be held via ZOOM.

19

Hug-in-a-Mug

"Warm Your Soul" Mug
Individual Coffee & Creamer, Tea & Honey Packets, Hot Apple Cider Packet, Hot Cocoa & Marshmallows
~The consumption of hot liquids may reduce stress and combat seasonal depression due to lack of sunlight in the winter.

"Trail Mix" Mug
Dark Chocolate, Dried Fruit, Nuts & Seeds
~These nutritional items offer many health benefits, and are a good source of antioxidants, provide long lasting energy, may lower cholesterol, and aid in weight loss.

"Pamper Yourself" Mug
Face Mask, Lip Balm, Lotion & Bath Bomb
~ Relaxing and soothing self-care activities are beneficial in reducing stress, by offering alone time and physical skin improvements.

Please select one mug and email your choice by Friday February 23rd to place your order.

MAKE A HANDMADE PAPER BAG JOURNAL FOR SELF-REFLECTION AND EMOTIONAL STRENGTH

WEDNESDAY 3/1/23 10:00AM-2:00PM
CONFERENCE ROOM A DROP IN –
ALLOW 1 HR MINIMUM TO ASSEMBLE YOUR JOURNAL.

"The greatest gift of journaling is recognition. No matter what type of journaling you do, the advantage of putting it on paper is a new point of view." Jenny Meyer

HOSTED BY: Grief Services Wellness Committee

20

Denver, CO

Family Advocate Support Team (FAST):

- Team dedicated to the support of families
  - 2 fulltime, career service employee positions, funded through general funds
  - Internship program with 6 interns
- Handle family/crisis calls, while also proactively engaging families in postvention support
- FAST can meet with family rather than an investigator. When families need additional hand holding or a particular resource/referral, an advocate has the time and skillset to do that
- Allows investigators ability to focus on other job duties
- Meeting the needs of the families, friends, and witnesses that encounter Denver Office of the Medical Examiner

21

Staff Gatherings

- All staff potluck meeting once a month: agency updates, team building and socialization

Nomination and Recognition

- "Employee of the Year": peer nomination, reward of 8hrs of exemplary performance time, name engraved onto a plaque on display.
- Exemplary performance time: 20 hours a year maximum

Team Building Events

- Two off-site all office team building events each year.

Contracted Mental Health Treatment

- 1st responder trauma therapy through city contract
- Up to 6 sessions a year for employee and 6 sessions for their partner/spouse
- Confidential for employee and spouse

22

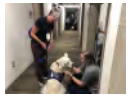
Pet Therapy

- Supports staff wellness with one-hour visits 3x a month

Shift Management

- Encourage work life balance.
- Employees can work 4/10 shifts with supervisor approval





23

WMed

- ***Western Michigan University Homer Stryker M.D. School of Medicine*** in Kalamazoo, MI
- **WMed Wellness Initiative: Launched in 2019**

  Mission: *To support, educate, and inspire all members of the medical school community to nurture mind-body-spirit wellness for themselves, others, and the community as a whole*

- **Associate Dean for Culture & Chief Wellness Officer**
- **Weekly WMed Wellness offerings sent via email**
  - Walking group, yoga (in-person, virtual), meditation, Wellness and Culture Media Club

24

WMed (continued)

- **Wellness Workshops and Wellness Noontime events**
  - Mindfulness: An Introduction to the Practices and Benefits of Being in the Here and Now
  - Maximizing Resilience, Well-Being and Happiness: Actions We Can Take to Better Our Lives
  - Practicing Gratitude: The Why and How of Giving Thanks and What to Do When You're Just Not Feeling It
  - Food as Medicine: The Vision of the KVCC Community Culinary & Nutrition Program
- **WMed Well-Being Promotion/Suicide Prevention Symposium (annual)**
  - *"aims to raise awareness, provide education, and encourage conversation about the importance of mental health and well-being in the health care and medical school community"*
  - FREE and open to the public

25

WMed (continued)

- **Employee Assistance Program**
  - Available 24/7
  - *"confidential and voluntary support service that is fully accessible to students, residents/fellows, faculty, and staff and immediate household members to help find solutions to life's challenges"*
- **Annual fitness/wellness stipend**
  - Faculty, residents, staff
    - Fitness center memberships
    - Fitness classes (including online)
    - Wellness, nutrition, and fitness apps
- **On-site fitness center**

26

How do we fund it?

- Nevada: State law, $4 death certificate fee to support the county coroner's office, with one prescribed use being "a program to promote the mental health of the employees of the office of the coroner, or any person impacted as a result of providing services in his or her professional capacity in response to an incident involving mass casualties".
- New Mexico: State appropriations
- WMed: Medical School (general fund)

27

Benefits Realized

- Reduced staff turnover, particularly death investigators
- Reduced sick leave usage
- Improved office morale and teamwork
- Increased productivity & ability to handle peak caseloads
- Office culture of wellness, work-life balance, burnout prevention

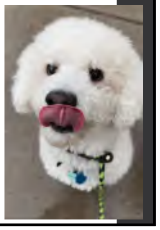
28

Conclusions and Recommendations

- Implement a formal Peer Support program
- Provide access to counseling / therapist who is trauma-informed
- Help staff connect via social events, group sessions
- Try various group activities to see what engages your colleagues
- Create opportunities for positive feedback and recognition
- **Create a culture that values wellness**

-We can do better than "Suck it up, buttercup, you signed up for this"!

- More dogs



29

References:

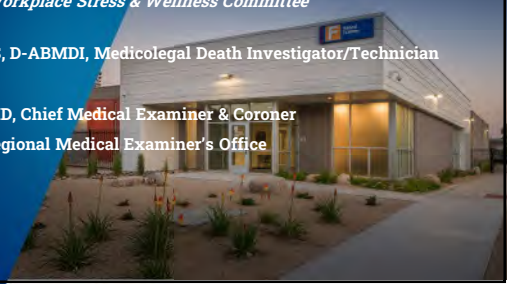
1. Centers for Disease Control and Prevention. Well-Being Concepts website. https://www.cdc.gov/hrqol/wellbeing.htm. Accessed July 19,2018
2. Kömür İ, Ozdemirel RO, Ozver İ, Başpinar B, Demir M, Gönen F, Kandemir E, Emul M. Posttraumatic Stress and Burnout Symptoms in Forensic Doctors and Staff in a Mortuary. Am J Forensic Med Pathol. 2017 Sep;38(3):184-188. doi: 10.1097/PAF.0000000000000329. PMID: 28691950.
3. Van der Ploeg E, Dorresteijn SM, Kleber RJ. Critical incidents and chronic stressors at work: their impact on forensic doctors. *J Occup Health Psychol*. 2003;8(2):157–166.
4. Rineer J, et al. Work-Related Stress Among Medicolegal Death Investigator Professionals: Sources of Stress, Health Outcomes, and Protective Factors. https://www.rti.org/impact/work-related-stress-among-medicolegal-death-investigators

30

Starting and Maintaining a Peer Support Program in a Medical Examiner/Coroner Office

From the NAME Workplace Stress & Wellness Committee

Kelli Oxborrow, BS, D-ABMDI, Medicolegal Death Investigator/Technician Supervisor
Laura D. Knight, MD, Chief Medical Examiner & Coroner
Washoe County Regional Medical Examiner's Office
Reno, NV



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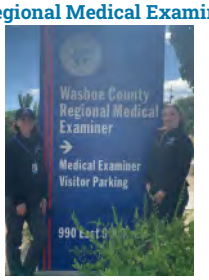
Washoe County Regional Medical Examiner Peer Support Team



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Washoe County Regional Medical Examiner's Office, Reno, NV

Serving 19 Counties in NV and CA

3

Washoe County Peer Support Stats

- From 2020 to 2022, more than 50% of our MDI/ Tech staff resigned due to burnout.
  - Only two of these are currently working in a related field.
  - The average years of service for those who quit was 9 years.
- On the average, our Peer Support Team has approximately 30 peer interactions per month. Additional follow up is not included in these numbers.

4

Washoe County Regional Medical Examiner's Office

Staffing:
(1) Chief Medical Examiner
(1) Deputy Chief Medical Examiner
(1) Operations Manager
(3) Assistant Medical Examiner
(3) Medicolegal Death Investigator/Autopsy Technician Supervisors **(1 Peer Support)**
(14) Medicolegal Death Investigator/Autopsy Technicians **(1 Peer Support)**
(3) Intermittent Hourly Medicolegal Death Investigators
(3) Administrative personnel

5

Peer Support Stats

Trackable interactions:

Family/ Relationship
Mental Health and Well being
Health Issues
Sleep Related Issues
Traumatic events
Substance Abuse
Relationship
Work concerns
Suicide Exposure
Financial Concerns
Postpartum Symptoms
Burnout/Overworked
Workplace Safety
Child Death
Suicide/Ideation Intervention

6

Washoe County Regional Medical Examiner Peer Support Mission Statement

To recognize behavioral changes and provide support to the staff of the WCRMEO who are experiencing a range of emotional needs in a safe, non-judgmental and confidential environment and provide resources or engage in a healing conversation with a peer.

7

Nevada Revised Statue

NRS 281.805 Peer support counseling for law enforcement and public safety personnel; Confidential communications; authorized disclosures; applicability; limitations on liability

Any communication made between parties during a peer support counseling session is confidential and must not be disclosed by any person participating in the peer support counseling session unless:

- Any explicit threat of suicide
- Any explicit threat of imminent and serious threat of physical harm or death of another
- Any information regarding the abuse or neglect of a child, older person or vulnerable person
- Any admission of criminal act

8

Employee Assistance Program

- 6 Free sessions for every occurrence
- Each family member may receive services
- Services are paid for by Washoe County
- Services include:
  - Confidential emotional support (therapeutic sessions)
  - Work-life solutions
  - Legal guidance
  - Financial resources
  - Online support
- FREE SERVICES 24 hours a day, 7 days a week

Concerns with EAP services (clinicians are not vetted and do not provide trauma informed care)

9

Washoe County Sheriff's Office Peer Support Team

10

Washoe County Sheriff's Office Peer Support

The Washoe County Sheriff's Office Peer Support Team has 50 members that are made up of sworn, civilians, clergy, mental health professionals and public safety members.

Peer support is an individual interaction where you can speak confidentially to a peer that you can identify with for direction and education on processing traumatic events

11

Washoe County Sheriff's Office Peer Support Stats

The Washoe County Sheriff's Peer Support Team, which is comprised of less than 50 specialist, has approximately 300 peer interactions per month.

12

Washoe County Sheriff's Office Peer Support

Who can initiate a peer support interaction:

- Anyone
  - Sworn or civilian
  - Co-Workers
  - Supervisors
  - Family

13

Washoe County Sheriff's Office Peer Support

- Training opportunities:
  - Bi-monthly Peer Support trainings to develop skills on how to provide guidance and referrals, role playing
  - Monthly paycheck withdrawals for trainings
    - K-Love Trainings www.crisisresponse.org
    - What is Crisis Response Care
    - Free Trainings
    - CRC handouts and podcasts

14

Northern Nevada Peer Support Network

15

Northern Nevada Peer Support Network

- Resiliency Center
- List of vetted clinicians and treatment centers for responders
- Education and training opportunities
- Obtain information on local support groups (LGBTQ+ Grief and loss, marriage and family counseling and wellness programs.
- Trauma informed yoga
- Podcast and videos
- Recommend readings

16

10 Steps to build your Peer Support Program

Obtain buy-in	Identify a team lead
Recruit your team	Develop your team
Identify a behavioral health clinician	Train your team
Develop referral network	Conduct regular outreach
Maintain your team	Evaluate your impact

17

Thank you

Questions or Comments?

koxborrow@washoecounty.gov

18

DIVERSITY, EQUITY, AND INCLUSION: A SENSE OF BELONGING IS KEY TO WORKPLACE WELLBEING

NAME 2023 Annual Meeting
October 13 - 17, 2023
San Jose, California

Jan M. Gorniak, DO, MHSA
(She/Her)
Tallahassee, Florida

1

ARE YOUR DIVERSITY AND INCLUSION EFFORTS HELPING EMPLOYEES FEEL LIKE THEY BELONG?

2

"AN ORGANIZATION WITH A DIVERSE WORKFORCE IS NOT NECESSARILY AN INCLUSIVE ONE BECAUSE IT DOES NOT NECESSARILY LEAD TO A SENSE OF BELONGING."

Michael Slepian
Columbia Business School

3

DO I BELONG HERE???

- Lower organizational commitment
- Lower employee engagement
- Individual feelings of loneliness and lack of purpose
- Self-sabotage and sabotage of the team
- Increase risk of alienation, burnout, and underperformance

4

DEFINITIONS

Diversity – The presence of different and multiple characteristics that make up individual and collective identities, including race, gender, age, religion, sexual orientation, ethnicity, national origin, socioeconomic status, language, and physical ability.

Equity – The process of identifying and removing the barriers that create disparities in the access to resources and means, and the achievement of fair treatment and equal opportunities to thrive.

Inclusion – Is creating environments in which any individual or group can be and feel welcomed, respected, supported and valued to participate fully.

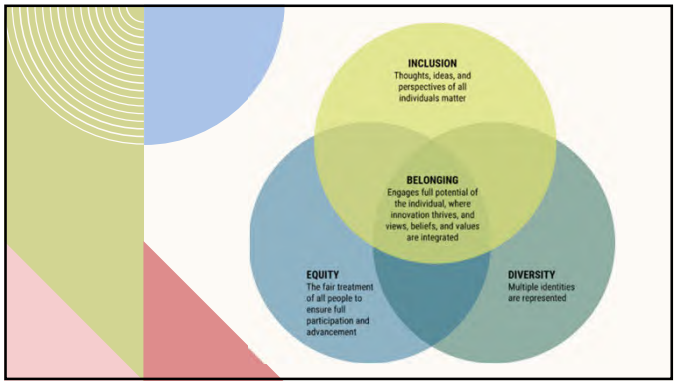
5

6

BELONGING

A sense of being secure, recognized, affirmed, and accepted equally such that full participation is possible.

7



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DIVERSITY, EQUITY, INCLUSION, AND BELONGING (DEIB)

framework that encourages a community where all groups experience equal opportunity, a sense of inclusiveness, and psychological safety to be authentic

9

PSYCHOLOGICAL SAFETY

A shared belief held by members of a team that it's OK to take risks, to express their ideas and concerns, to speak up with questions, and to admit mistakes — all without fear of negative consequences

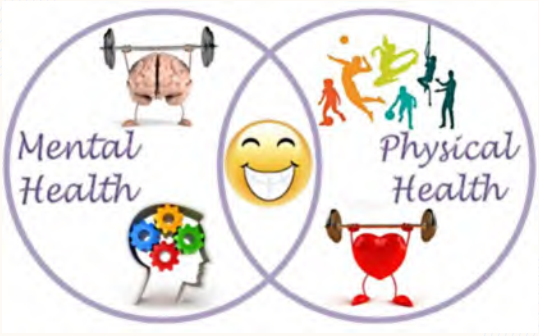
10

Leads to team members feeling more engaged and motivated, because they feel that their contributions matter and that they're able to speak up without fear of retribution.

Leads to better decision-making, as people feel more comfortable voicing their opinions and concerns, which often leads to a more diverse range of perspectives being heard and considered.

Fosters a culture of continuous learning and improvement, as team members feel comfortable sharing their mistakes and learning from them

11



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MASLOW'S HIERARCHY OF NEEDS

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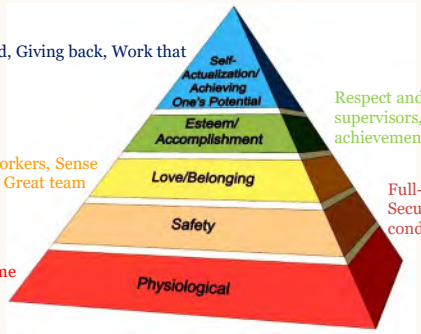

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PILLARS OF BELONGING

- **Welcomed** - experience a sense of belonging are intentionally introduced to, and incorporated within, the organizational culture and community
- **Known** - feel understood, motivated and celebrated as an individual
- **Included** - feel valued and accepted without reservation
- **Supported** - consistently and meaningfully nurtured and developed
- **Connected** - empowered to develop and maintain relationships across a diverse population

15

I would recommend this company as a great place to work

I rarely think about looking for a job elsewhere

I am enthusiastic about my job

I am my most productive self at work

I am satisfied with my current role

I feel supported to take care of my physical wellness

I feel competent in my role

I feel a strong sense of safety at work

I feel capable of managing obstacles and challenges as they arise

I am a good fit with the culture and the way we do things at my company

I feel a sense of purpose in my role

16

17

THANK YOU

Jan M. Gorniak, DO, MHSA
(She/Her)
drquincydo@sbcglobal.net

18

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Strategies for Resiliency among MDI Professionals

Michael P. Williams M.D., M.Sc., Falone C. Amoa MD M.S., Amy E. Theriault D.O. M.S., Alyssa Byrd M.D., Amanda L. Farrell Ph.D., Brandi C. McCleskey M.D.

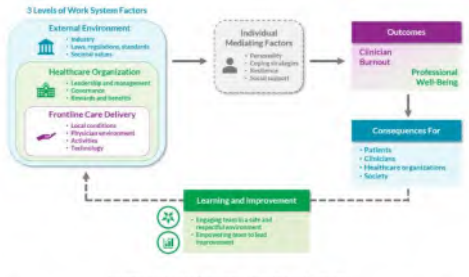
From the NAME Workplace Stress & Wellness Committee

1

Introduction

- Burnout is a pathological syndrome characterized by emotional depletion and maladaptive detachment.
- Forensic pathologist and autopsy technicians:
  - Increased risk of posttraumatic stress owing to work-related stressors.
  - Autopsy technicians reported more emotional exhaustion.
- Trainees :
  - well-being including work scheduling/intensity, safety including workplace and driving, ability to attend medical appointments.
  - Effect on educational experience – decreased motivation and curiosity to learn, engage in scholarly activities, and teach doi: 10.1002/wel2.10500

2



A Systems Model of Clinician Burnout and Professional Well-Being

Adapted from National Academies of Sciences, Engineering, and Medicine 2019. Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being. Washington, DC: The National Academies Press. https://doi.org/10.17226/25521.

3

Strategies utilized on the individual level

4

Mindfulness

Journaling

Exercise/Yoga

Reflection

Music Therapy

4

Strategies Utilized on the Organizational Level

5

Transportation within and outside UAB

Blazer Kitchen

5

UAB Organizational Strategies

6

UAB Medicine Office of Wellness

Physician appointments for Trainees

6

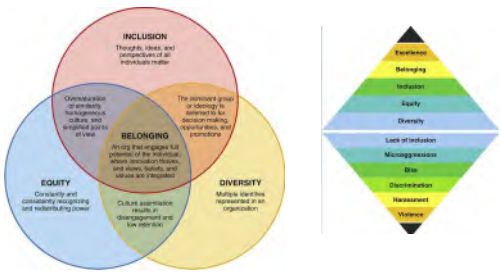
7

UAB Pathology Wellness (Need Pictures Please)

- Educational retreat
- Respite Room
  - Yoga mat and weights
  - Art therapy
  - Prayer
  - Quite space
- Resident events in the community
- Birthday recognition emails
- Meals and snacks
- Professional development block

8

Diversity, Equity and Inclusion



2020 American Heart Association and American College of Cardiology Consensus Conference on Professionalism and Ethics: A Consensus Conference Report | Journal of the American College of Cardiology (acc.org)

9

Conclusion

- Burnout is prevalent in the medical community including the forensic setting.
- Proactively implementing wellness strategies can help retain and attract trainees and MDI professionals.
- Sharing of strategies implemented at varying institutions/places of work that can be utilized as a basis to constructing wellness initiatives.

10

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
NAME Workplace Stress & Wellness Committee

Thank you!

11

Assessing Medicolegal Death Investigator Staffing Needs: Caseload verses Workload

2023 National Association of Medical Examiners
Annual Meeting
San Jose, California

Steve Clark, PhD – Amy Hawes, MD – Julie Howe, MBA, D-ABMDI – Lauri McGivern, MPH, F-ABMDI

1

Challenges in ME/C Offices

- Increase in caseload
- Shortage of Forensic Pathologists
- Shifting responsibilities to MDI's
- Additional work duties for supervisors

2

Introduction

- Beginning in 2023 a general survey was developed to obtain partitioner opinions on several medicolegal death investigator job tasks.
- Survey participants were members of three professional MDI organizations (NAME, IACME, SOMDI) and those registered with the MDI certification board (ABMDI).
- In addition to agreement levels associated with job tasks, survey respondents were asked to rate their level of agreement with including MDI workload standards into ME/C office accreditation standards.

3

Goals and Objectives

- Assess Medicolegal Death Investigation Staffing Needs:
- Caseload versus Workload Complexity.
- Compare currently suggested staffing models (population-based) with survey respondent's ratings on several questions related to their job tasks and their ability to complete tasks within the workday.

4

Survey Focus

- Opinions about the need for an accreditation standard regarding MDI staffing.
- Factors may affect defining MDI staffing standards.
- Workload complexity and work-related stress.
- Defining MDI responsibilities beyond death scene investigations.

5

The Survey Instrument

- Survey was distributed online between DATES.
- Survey contained seven (7) sections, 60 items:
  - DEMOGRAPHICS: Jurisdiction, age, years experience, etc.
  - GENERAL: Thoughts on Setting Workload Standards (rate).
  - MDI ROUTINE: Typical Case Numbers and Times (open).
  - MDI ROUTINE: Thoughts about your MDI Workday (rate).
  - MDI ROUTINE: Feelings about your MDI Job (rate).
  - MDI Tasks: Additional Job Responsibilities (rate).
  - MDI Workload: Most Important Considerations (rank).

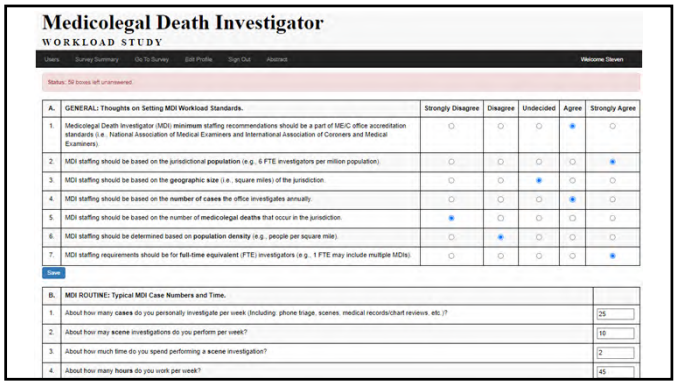
6

The Numbers

- April 13, 2023 – 2,483 email invitations sent.
- May 8, 2023 – After three reminders – survey closed.
- Total Respondents: 333 (13.4%).

- NAME = 103
- IACME = 1053
- ABMDI = 1975
- SOMDI = 194

7



8

Selected Results

- Sectional results – all respondents

9

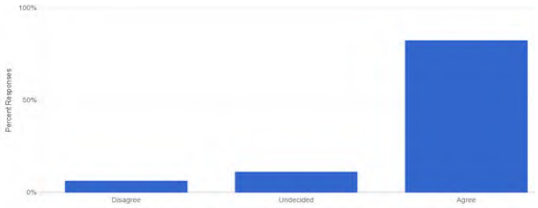
A. Thoughts on MDI Workload Standards

A	THOUGHTS ON WORKLOAD STANDARDS	N	Disagree	Agree	UD
1	Should be a part of ME/C office accreditation	330	6.4	82.4	11.2
2	Staffing based on population of jurisdiction	329	18.2	65.9	15.8
3	Staffing based on geographic size of jurisdiction	328	22.8	52.4	24.7
4	Staffing based on cases investigated by office	328	7.0	82.3	10.6
5	Staffing based on ME/C deaths in jurisdiction	328	9.7	75.3	14.9
6	Staffing based on population density	328	22.2	47.8	29.8
7	Standards for FTE investigators	328	11.5	57.9	30.4

10

Selected Results - Accreditation

Should "minimum" MDI staffing be a part of office accreditation standards (i.e., NAME, IACME).



NUMBERS: n=330, 82.4% Agree/Strongly Agree)

11

B. Estimated Performance Numbers

B	TIME ON TASK	N	Average	Median
1	Cases Investigated per week	308	17.4	10.0
2	Scenes per week	292	4.6	3.0
3	Time performing scene investigation (hrs)	300	2.0	1.5
4	Work hours per week	318	45.0	40.0
5	Normal “shift” hours	316	12.6	10.0
6	Time performing case follow-up tasks (hrs)	308	2.3	2.0
7	Time writing case report (hrs)	310	1.8	1.0
8	Time providing data to outside agencies (hrs/wk)	258	2.1	1.5
9	Time providing data to media (hrs/wk)	130	2.0	1.0

12

C. Work Completion and Effort

C	ABILITY TO GET WORK DONE WITHIN SHIFT	N	Disagree	Agree	UD
1	Rarely complete investigations by end of shift	322	66.4	28.5	4.9
2	Complete most investigations by end of shift	322	26.4	70.8	2.8
3	Complete investigation report by end of shift	322	30.1	66.1	3.7
4	Frequently have spare time during shift	322	63.9	21.4	14.6
5	Occasionally have spare time during shift	321	45.7	41.1	13.0
6	Rarely have spare time during shift	321	37.3	52.6	9.9
7	Job requires little mental effort	322	95.3	3.1	1.5
8	Job requires moderate mental effort	321	40.5	50.1	9.3
9	Job requires extensive mental effort	321	11.2	79.1	9.6

13

D. Job Stressors

D	CONFUSION - RISK - FRUSTRATION - ANXIETY	N	Disagree	Agree	UD
1	Little confusion about job expectations	320	22.8	71.2	5.9
2	Little risk associated with my job	319	82.1	12.2	5.6
3	Little frustration associated with my job	319	75.5	17.5	6.9
4	Little anxiety associated with my job	320	70.0	22.1	7.8
5	Any anxiety and stress can be easily controlled	319	32.9	38.2	28.8
6	Moderate stress adds to my workload	319	20.3	63.0	16.6
7	Self-control required to cope with interpersonal stress	319	14.4	73.9	11.6
8	Self-control required to cope with human interaction stress	319	10.3	79.9	9.7
9	Self-control required to cope with situational stress	319	12.5	78.0	9.4
10	Intense stress due to confusion, frustration and anxiety	319	42.6	40.7	16.6

14

E. Most Performed Job Tasks

E	ADDITIONAL JOB RESPONSIBILITIES	N	Rarely	Occasionally	Frequently
1	Request/obtain medical history from families	320	1.8	5.0	93.1
2	Request/obtain medical records	320	3.7	6.2	90.0
3	Perform scene investigations	320	4.0	5.9	90.0
4	Determine jurisdiction (AJ/DJ)	320	4.0	5.9	90.0
5	Request/obtain medical history from physicians	320	3.7	12.1	84.0
6	Perform office administration tasks	320	9.6	12.5	77.8
7	Perform decedent identification tasks	320	6.2	17.1	76.5
8	Inventory prescription medications	320	15.3	22.1	62.5
9	Perform next-of-kin notifications	320	24.0	18.7	57.1
10	Perform cremation approvals	320	46.8	9.6	43.4
11	Collect evidence	320	30.0	26.8	43.1
12	Conduct training activities	320	25.6	32.5	41.8
13	Arrange unclaimed body disposition	320	35.9	24.0	40.0
14	Accept/release bodies from autopsy facility	320	45.9	15.0	39.1
15	Transport Bodies	320	58.1	10.9	30.9
16	Enter case data in state/national databases	320	54.0	19.6	26.2
17	Perform autopsy assistant tasks	320	73.1	16.8	10.0
18	Provide court testimony	320	70.3	26.2	3.4

15

F. Top Rated Workload Considerations

F	Top Workload Consideration Factors	N	Rank #1	Rank #2	Rank #3
1	Case complexity of non-natural deaths	309	28.4	23.3	16.8
2	FTE staffing a part of accreditation standards	309	24.2	9.7	11.6
3	Indirect investigation activities	311	23.1	32.4	19.6
4	Population served	309	12.9	13.2	12.6
5	FTE per autopsies performed in jurisdiction	311	6.4	7.2	12.8
6	FTE per jurisdiction's geographical size	309	3.5	8.7	6.8
7	Non-investigative activities	310	1.9	5.1	20.0

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General Conclusions

1. **How an office sets workload standards (i.e., population served, ME/C case load, jurisdictional geography, case complexity, etc.) is undetermined. However, MDI's appear to want workload standards included in office accreditation standards.**
2. **If there were one consideration for workload standards, it appears case complexity of non-natural deaths would be a priority.**
3. **Gathering decedent medical "histories" is a significant job task.**
4. **MDI spend <90 minutes writing a case reports.**
5. **MDI complete most investigations by the end of their shift.**
6. **MDI work a "normal" number of hours in a workweek.**
7. **17 investigations per week, 5 being on-scene (~3.4 per 8-hour shift).**
8. **Working with people is a primary job stressor.**
9. **Working with data (cognitive skills) is considered paramount.**
10. **There is little spare time during the work shift.**

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Next Steps

Assess if existing per capita MDI staffing is adequate for quality investigations

Consider workload complexity factors in determining caseload recommendations

Recommend standards for MDI caseload in accreditation process

18

Thank You

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NMS LABS

Forensic Toxicology Laboratories Partnering for Expanded Testing of NPS in PM Investigations

Donna Papsun, MS, D-ABFT-FT
Forensic Toxicologist & Business Scientist
October 2023

1

Disclaimer

- Donna Papsun is a paid employee of NMS Labs, a commercial provider of Toxicology and other forensic testing services.
- The work conducted at CFSRE was funded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice (Award Number 2020-DQ-BX-0007, "Real-Time Sample-Mining and Data-Mining Approaches for the Discovery of Novel Psychoactive Substances (NPS)"). The opinions, findings, conclusions and/or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect those of the Department of Justice.

1 Sample source formatting.
2 Sample source formatting.

2

Novel Psychoactive Substances (NPS)

Scientific term that encompasses new substances hitting the recreational drug market

Compounds are either repurposed from pharmaceutical research or chemically modified by other drugs of abuse

Other terms include designer drugs, "research chemicals," "legal highs" – *and not necessarily!*

NSO = Novel Synthetic Opioid
SCRA = Synthetic Cannabinoid Receptor Agonist
DBZD = Designer Benzodiazepine

Product names can vary greatly, including K2, incense, "bath salts", etc.

3

NPS Definitions

Novel (or new) psychoactive substance can be natural, synthetic, or semi-synthetic substances in pure form, mixture, or preparation that can be categorized using one or more of the following criteria:

A substance that has been discovered or synthesized for the first time since the mid-2000's and is being ingested by drug users regardless of degree of psychoactive effects

A substance that was previously discovered, synthesized, or reported (e.g. patents, literature, publications, etc.) but has been observed in the current street drug supply or identified in toxicological samples from drug users for the first time in more than 10 years

A substance that since the mid-2000's has been used in a novel way or differing manner from its original intended use (e.g. different dosage form or amount to produce effects, different preparation, etc.)

A substance that previously was not-well described or studied but now presents significant challenges or threats due to an altered toxicological effect profile as a result of increased use or popularity

A substance that is not controlled by the United Nations drug conventions, but which may pose a public health threat comparable to that posed by substances listed in these conventions .

*source: Center for Forensic Science Research & Education

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NPS Phenomenon

- New
- Transient (typically!)
- Limited available information
- Limited reference material
- Underestimated prevalence
- Subject to national & international influences
- Can pose significant threat to public health & public safety

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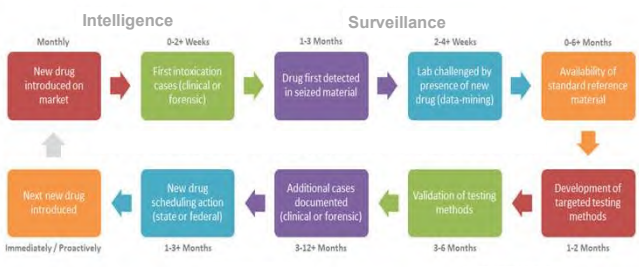
5

Life Cycle & Timeline of NPS Testing



Courtesy: Alex Krotulski, PhD, CFSRE

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6

The Business of NPS

Method Development for one to several compounds - $25,700

Validation - $15,000

IT costs - $9,000

Approximate total cost for one new test: $49,700

Includes scientist time, instrument time, costs of materials, etc

Opportunity cost for not allocating resources on a different project

Depreciation cost for NPS tests are variable

Asset Cost / Useful Life = Depreciation Value per Year

"Useful Life" depends on life span and how quick test is to market

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Challenges & Solutions

Challenges	Solutions
Toxicology laboratories are struggling with developing new tests Requires significant resources NPS may require additional testing in a case → $$$	**Screening by High Resolution Mass Spec (HRMS) instruments**
Medical Examiners & Coroners also have limited resources	**Surveillance libraries** Requires significant management
	Data-driven decision making for test development
	Partnerships between labs

cfsre

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Time-of-Flight (TOF) Screening

TOF/QTOF analysis

- Non-targeted acquisition/targeted reporting
- Provides highly sensitive comprehensive analysis in forensic casework
- Need set identification criteria and review chromatography

Data-mining can occur in real time or retrospectively

- Emerging substances (NPS) using updated libraries
- Chemical signatures
- Create historical pharmacoepidemiological maps
- Establish emergence timelines
- Analyze sample once, data repeatedly

openkod_digital_wide0817-768x480.jpg (768×480) (drugtrackandtrace.com)

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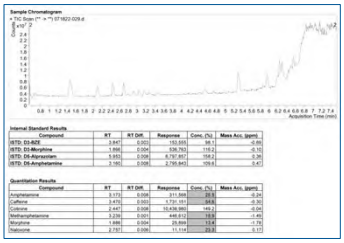
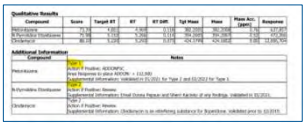
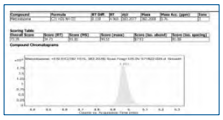
Surveillance Library Example

29 y/o decedent – only other reported finding Delta-9 Carboxy THC







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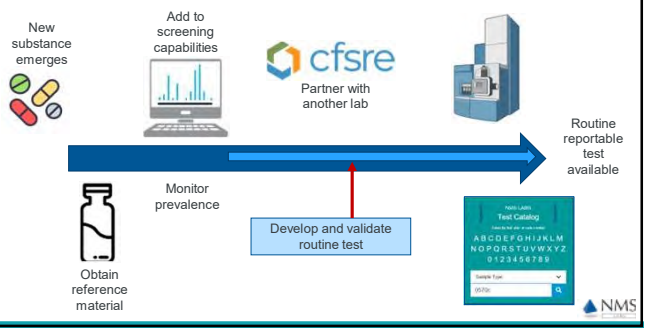
Partnering with CFSRE for NPS Testing



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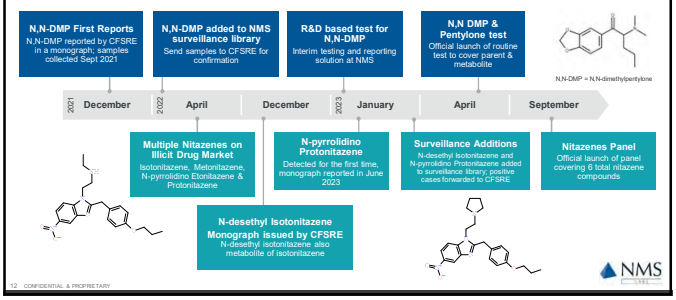
Timelines for NPS Testing Partnerships



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Case Example

Decedent was found unresponsive in residence

Drug paraphernalia found on scene

Decedent had a history of prescription type drug abuse, with recent hospital admissions

Autopsy findings included

- **Pulmonary congestion**
  - combined lung weight >1800 g
- **Moderate cerebral edema**
- **Hepatic steatosis**

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Case Example

Postmortem case underwent expanded testing

Findings within Scope of Testing	Additional Findings
Bupropion – 100 ng/mL	More testing at original laboratory
Hydroxybupropion – 250 ng/mL	Flualprazolam – 5.7 ng/mL
O-desmethyltramadol – 560 ng/mL	Delorazepam – 6.2 ng/mL
Chlorpheniramine – 48 ng/mL	8-aminoclonazolam – 7.5 ng/mL
Dextrorphan/Levorphanol – 33 ng/mL	Surveillance Library Findings
Dextro/Levo Methorphan – 450 ng/mL	2-methyl 2 AI ☆
Citalopram/Escitalopram – 490 ng/mL	para-methyl AP-237 ☆
Pseudoephedrine – 180 ng/mL	Dipyanone ☆

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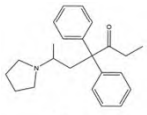
Laboratory Partnership

Reported findings evaluated during case review

Toxicologist reached out to ME to discuss case

ME wanted to pursue additional testing with partnering agency

Toxicologist transferred blood with approval

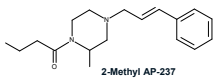


Dipyanone

CFSRE Testing

Dipyanone – 370 ng/mL

2-Methyl AP-237 – 24 ng/mL



2-Methyl AP-237

Vandeputte MM, et al 2023. Detection, chemical analysis, and pharmacological characterization of dipyanone and other new synthetic opioids related to prescription drugs. Analytical and Bioanalytical Chemistry.
Fogarty M, et al. 2022. Toxicological and pharmacological characterization of novel cinnamylpiperazine synthetic opioids in humans and in vitro including 2-methyl AP-237 and AP-238. Archives of Toxicology.

15

Take Home Messages

- Continued emergence of NPS drives a dynamic illicit drug market
- NPS are challenging to *everyone*
- Play a role in public health & safety, surveillance efforts
- Responsive analytical workflows are essential to identify emerging drugs
- Collaborative relationships are also key
  - Between different tox labs
  - Between toxicologists and MEs/coroners

16

Acknowledgements

Sara Walton, CFSRE
Dr. Alex Krotulski, CFSRE
Melissa Fogarty, CFSRE
Dr. Barry K. Logan, NMS Labs & CFSRE
Dr. Lindsey Harle, Snohomish County Medical Examiner

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17

Questions? Answers.

18

Leveraging medical examiner data to inform public health response and prevent overdose

Megan Broekemeier, MPH, CHES
Michael Szaley, PhD
Jack Pfeiffer, PhD
Erik Christensen, MD

Utah Department of Health & Human Services

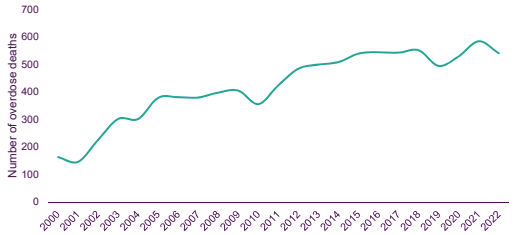
Acknowledgements

This work was supported by the Centers for Disease Control and Prevention (CDC) Overdose to Action Grant (RFA CE19-1904).

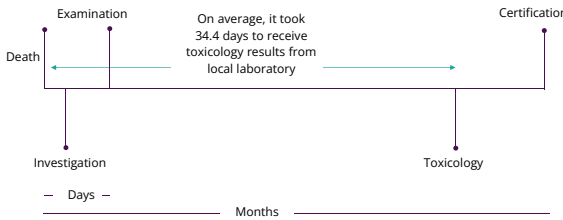
Overview

1 Understand — 2 Plan — 3 Implement — 4 Evaluate

Rise in overdose deaths in Utah



Timely data drives response and saves lives.



Hood, J., Vannice, K., & Nicole Yarid. (2019, November). *Accuracy of Medical Examiner's Assessment for Near Real-time Surveillance Fatal Overdoses – King County, Washington, March 2017 – February 2018.*" SUDORS Workgroup Webinar.

CDC Rapid Opioid Death Detection (RODD)

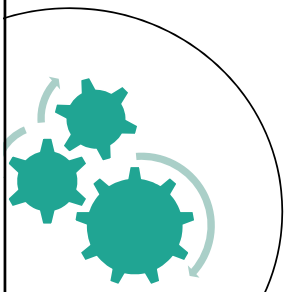
- Identify suspected unintentional and undetermined intent opioid overdose deaths within one month of death before key pieces of information are available:
  - Final forensic toxicology data
  - Death certificates
- Ultimate goal is to rapidly detect opioid overdose outbreaks or sharp increases in opioid overdose deaths and inform local prevention and response efforts.

"Choose a ME/C that collects high quality autopsy and death scene investigation reports."

Medical examiners are well suited to rapidly identify overdose deaths.

Project planning and implementation

Suspected overdose case definition



- Physical form available for every case.
- Form completed by pathologist during/immediately following examination.
- Data abstracted by epidemiologist.

Data collection

Data dissemination

Evaluation

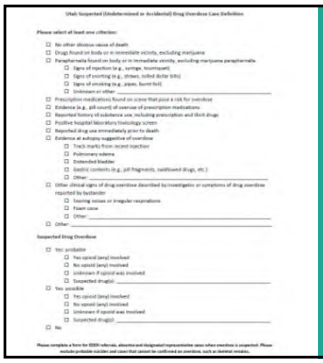
What proportion of true overdose deaths were correctly identified by the suspected tracking system?

80%

66%

What proportion of suspected overdose deaths identified by the suspected tracking system are true overdose deaths?

Probable overdoses were statistically significantly more likely to be a true overdose than possible overdoses.



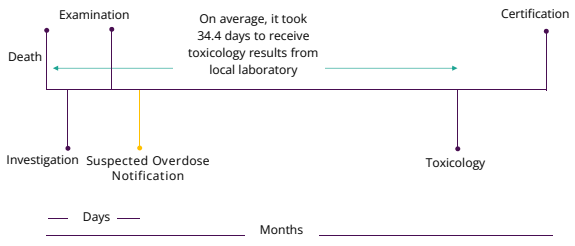
Case definition revision

What proportion of true overdose deaths were correctly identified by the suspected tracking system?

88%

61%

What proportion of suspected overdose deaths identified by the suspected tracking system are true overdose deaths?

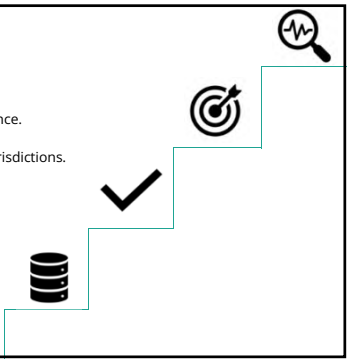


Hood, J., Vannice, K., & Nicole Yarid. (2019, November). *Accuracy of Medical Examiner's Assessment for Near Real-time Surveillance Fatal Overdoses – King County, Washington, March 2017 – February 2018.*" SUDORS Workgroup Webinar.

Lessons learned

Next steps

- Evaluate aberration alert system.
- Refine and update data-use guidance.
- Fully automate system.
- Improve data sharing with local jurisdictions.



Many thanks!

Megan Broekemeier
mbroekemeier@utah.gov

Homicide versus Suicide: A Manner of Death Dilemma

Tatyana Zinger, D.O.

District of Columbia Office of the Chief Medical Examiner, Washington, DC

Sunday, October 15th

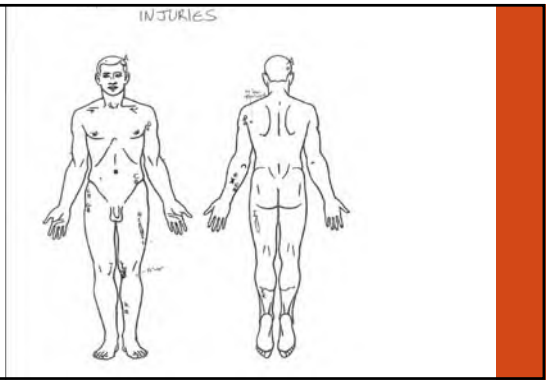
4:00 PM

1

Case History

- 24-year-old man witnessed to walk from Metro station to street when approached by an individual who shoots decedent with gun and flees scene
- Decedent attempts to run and falls near entrance of Metro
- Decedent crawls, produces his own handgun, and shoots himself in the head (video)
- Pronounced dead shortly after arrival to hospital

2



3

Final Diagnoses

I. Perforating gunshot wound to the head

II. Multiple gunshot wounds
- A. Penetrating gunshot wound to left axilla
- B. Penetrating gunshot wound to the abdomen
- C. Penetrating gunshot wound to the left arm
- D. Perforating gunshot wound to the left forearm
- E. Penetrating gunshot wound to the right hip
- F. Penetrating gunshot wound to the right thigh
- G. Graze gunshot wounds to the left thigh
- H. Penetrating gunshot wound to the upper left leg
- I. Perforating gunshot wound to the lower left leg

4

Death Certificate

CAUSE OF DEATH:	GUNSHOT WOUND TO THE HEAD
OTHER SIGNIFICANT CONDITIONS:	MULTIPLE GUNSHOT WOUNDS
MANNER OF DEATH:	SUICIDE
How injury occurred:	shot self after sustaining multiple gunshot wounds

5

Manner of Death Definitions

Purpose of manner of death: clarifying circumstances of death and how injury/cause occurred; mortality statistics

- "reasonable probability" suffices for most cases
- "preponderance of evidence" recommended for suicides
- "clear and convincing evidence" desired for homicides

Suicides: deaths that generally result from an injury caused by a self- inflicted act with the intent to self-harm
Homicides: deaths due to volitional acts at the hands of another (1)

6

Positing Questions

If the decedent had not gotten shot, would he have chosen to shoot himself, making the underlying cause the homicidal gunshot wounds?

How much should intent matter in this case -- if it can even be deduced -- versus video surveillance?

7

Considerations in favor of suicide

- Survivability of gunshot wounds of trunk and extremities if hospitalized before self-inflicted gunshot wound of head
- Video evidence of decedent crawling after the shots
- Video evidence of suicide: intent of killing self is obvious
- Manner-of-death classification should not be formulated on the basis of trying to facilitate prosecution (1)

8

Considerations in favor of homicide

- But-for the injury (or hostile environment), would the person have died when he did? (1)
- Being able to move after being shot doesn't mean death wouldn't have occurred
- When death involves natural and non-natural manners, preference is given to non-natural manner
- Volitional intent is present for homicide
- Lethality of femur fracture and quantity of gunshot wounds

9

Reflection

How would you sign the death certificate in this scenario?

If homicide, what (if anything) about the injuries sustained by others would need to change to call it suicide?

Changes to COD, MOD, and/or tweaking "How Injury occurred"?

10

Works Cited

1. Hanzlick, Randy, et al. *A Guide For Manner of Death Classification*. 1st ed., National Association of Medical Examiners, 2002.

Special thanks to Dr. Francisco Diaz, MD, Chief Medical Examiner of DC OCME

11

Manner of Death in Medical Assistance in Dying (MAiD)

Dr. Thambirajah Balachandra
Ms. Dana Johnson
Ms. Ariba Kamal
Office of the Chief Medical Examiner
Edmonton, Alberta, Canada

1

1

Declaration

Views expressed in this presentation are those of the authors and not that of the Government of Alberta

Authors have no conflicts of interest

Authors have no financial interest in this presentation

2

2

Exclusion

This presentation is strictly limited to discussion of scientific manner of death classification

The presenter will not intrude into the subject of sociology or philosophy of Medical Assistance in Dying

3

3

Introduction

Federal government passed legislation in June 2016 allowing eligible Canadian adults to request and obtain MAiD

Each of the ten provinces and three territories have enacted provincial legislation and safeguards to provide MAiD with committees to oversee the operation

4

Alberta

4

Introduction (Cont'd…)

In 2021, there were 10,064 MAiD procedures administered in Canada with the MAiD rate being 27 per 100,000 people

According to preliminary death data for 2021, there were 32 MAiD deaths per 1000 deaths in Canada

Population of Canada in 2021: 36,991,981 (Statistics Canada)
Deaths in Canada in 2021: 311,640 (Statistics Canada)

5

Alberta

5

Eligibility Criterion for MAiD

- Initially for terminal patients with foreseeable imminent deaths due to natural causes
- As of March 17, 2021, amended to those with grievous and incurable diseases, but no longer requiring foreseeable imminent death

6

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6

Examples of Imminent Foreseeable Natural Deaths

- Metastatic ovarian, lung, and renal cancers
- Terminal COPD with multiple admissions
- Terminal ALS

7

7

Grievous and Incurable Diseases, but not Foreseeable Imminent Death

- Cancer
- ALS
- Parkinson's Disease

8

8

What Happens After Death?

Procedures vary depending on the province/territory

In Alberta, MAiD deaths are reported to the Medical Examiner (ME) along with all the necessary documents

ME reviews the documents and issues a Death Certificate and Certificate of Medical Examiner

9

9

Current Classification System in Alberta

- Natural
- Accidental
- Suicide
- Homicide
- Undetermined
- Unclassified (MAiD)

MAiD deaths are classified as 'Unclassified'

10

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Review of MAiD Deaths

A Committee reviews these deaths quarterly

The Committee is comprised of members from Alberta health service (AHS), College of Physicians and Surgeons of Alberta (CPSA), Office of Chief Medical Examiner (OCME), College and Association of Registered Nurses of Alberta (CARNA), and Alberta College of Pharmacy (ACP)

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Challenges with Classification of MAiD

Highlighting three cases in which Medical Assistance in Dying (MAiD) was administered, yet the recorded manner of death differed from the classification of 'unclassified.'

12

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Case 1

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Case 1

- Young adult shot by another and sustained neck injuries
- Hospitalized for the next 8 months for quadriplegia
- Developed bedsores and osteomyelitis
- Requested MAiD and provision done
- Case reported to the Medical Examiner
- Case discussed with the police and full autopsy performed
- Police upgraded the charge from attempted murder to murder

14

14

Cause of Death

Part 1

- **(a) Immediate Cause of death:** Consented Medical Administration of Propofol, Fentanyl, and Rocuronium
- **(b) Antecedent Cause:** Complications of Quadriplegia
- **(c) Underlying Cause:** Gunshot Wound to the Neck

15

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Manner of Death

Homicide

16

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Case 2

17

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Case 2

- Elderly person had respiratory problems
- Investigated and pleural biopsy showed mesothelioma
- Workplace exposure to asbestos
- Deemed inoperable
- Suffered pain and severe breathing difficulties
- Requested MAiD and provision done
- Death reported to ME
- No Autopsy

18

18

Cause of Death

Part 1

- **(a) Immediate Cause of death:** Consented Medical Administration of Propofol, Fentanyl, and Rocuronium
- **(b) Antecedent Cause:** Malignant Mesothelioma
- **(c) Underlying Cause:** Workplace Exposure to Asbestos

19

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Manner of Death

Accidental

20

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Case 3

21

21

Case 3

- Young adult attempted suicide by jumping from a height
- Sustained multiple fractures and all successfully managed
- Left with loss of some bladder, anal, and sexual functions
- Had a successful career, and performed daily activities of life
- Unhappy with social life
- Requested and offered MAiD

22

22

Cause of Death

Part 1

- **(a) Immediate Cause of death:** Consented Medical Administration of Propofol, Fentanyl, and Rocuronium
- **(b) Antecedent Cause:** Complications of Fall from a Height

23

23

Manner of Death

Suicide

24

24

Manner of Death Classification

- In a medical examiner system, manner is for statistical and preventive use only
- Classifying manner especially in MAiD cases is controversial
- The true nature is obscured
- Criminal and Civil Courts do not have to abide by the ME determination of manner of death
- Does it carry a stigma?

25

25

Possible Future Consideration

Traditional 'manner of death' classification framework remains intact for statistical and death prevention purposes for MAiD death

MAiD deaths could be carefully monitored separately

26

26

Questions and Discussion

THANK YOU

ANY QUESTIONS?

27

27

The next generation of psychological autopsy: The Retrospective Fatality Analysis (RFA)

Michael J. Staley, PhD
Brett Harding, MBA, F-ABMDI
Shannon Harrison, PhD, LCSW
Anne M. W. Kelly, PhD
Brittany Miskowiec, PhD, MSW, LICSW
Janet Schnell, MSW, LCSW
Ramya Sundararaman, MD, MPH
Utah Department of Health & Human Services
RETROSPECTIVE FATALITY ANALYSIS CONSULTANTS

1

Psychological autopsy

Developed by Ed Schneidman in conjuction with the LA County Coroner's Office and LA Suicide Prevention Center to better understand the circumstances leading up to a suicide death.

Psychological autopsy provides a unique perspective into the time period immediately preceding and up to death – very hard-to-get evidence.

2

Limitations of psychological autopsy

- Narrow scope: relies too heavily on psychological aspects of suicide.
- Disagreement and misuse of method over the past 75 years.
- Standard protocol rapidly becomes out of date.
- Deficiencies in analytical methods.

3

Retrospective fatality analysis: A next generation method for understanding suicide mortality

- Expands the scope of suicide risk and protective factors to sociological and environmental domains.
- The standard protocol is regularly updated to reflect contemporary understandings of suicide and the social world.
- is clear it its scientific and forensic purpose.
- Robust analytical training and access to multi-disciplinary experts.

4

Foci of the RFA

- Connectedness and isolation.
- Change over time, especially in the period preceding death, and how this change contributes to, or protects from suicide risk.
- Dynamic inventory of risk and protective factors related to suicide.

5

Selected domains from RFA

- Residential status and homelessness
- Employment, underemployment, and unemployment
- Special considerations for first responders, service members, and veterans
- Connectedness and attachment
- Trauma in the life course
- Perpetrator status, engagement with law enforcement, and correctional history
- Inventory of diagnosed and undiagnosed mental health symptoms
- Access to and familiarity with firearms and other lethal means
- Ability to cope and deterioration of coping strategies
- Suicide diffusion and contagion
- Special considerations for minoritized groups

6

Use cases of RFA

- Research on suicide mortality and suicide prevention,
- Public health focused fatality reviews,
- Tool for fostering meaning making for suicide loss survivors,
- Investigating equivocal deaths,

7

Methodology

- Next-of-kin interview(s) with person closest to decedent.
- Then two or more interviews with subsequent informants.
- Consideration of secondary records, such as medical records, court records, journals and diaries, social media, etc.

8

Equivocal death investigation

9

MOTIVE	INTENT
	—

10

3 principal questions

- Why suicide?
- Why suicide *now*?
- Why suicide by this method?

- Bonus question: How could this suicide have been prevented?

11

RFA provides a broad range of evidence for the certifier to consider and assists in determining if the death is consistent or not consistent with suicide.

12

Byproducts of RFA

- Provides an opportunity for family, friends, and coworkers to provide input to the investigative process.
- In a social environment where suicide is still stigmatized, these conversations allow loss survivors to speak openly and understand the breadth of why someone close to them may have died by suicide.
- Provides the interviewer the opportunity to intervene in potentially life-ending distress.

13

Learn more and register to become certified in RFA. Next training is November 2. ABMDI continuing education credits available.

14

mstalev@utah.gov; rfaconsultantsllc@gmail.com

15

NAME-NRMP Forensic Pathology Fellowship Match

Results and Survey of Applicants

James Gill, M.D.
Maura DeJoseph, D.O.
Connecticut Office of the Chief Medical Examiner

September 28, 2023

1

2023 MATCH

- The 2023 Match occurred on May 3rd for positions starting in July 2024.
- The FP Match program follows the All-In-Policy, which means that fellowship programs that participate in the Match must register and attempt to fill all positions in the Match.

2

2023 MATCH RESULTS

- There were 40 programs that participated in the FP Match with 70 open positions.
- There were 47 applicants and all but two applicants matched (i.e., 95.7% applicants matched).
- Only 50% of the FP programs in the Match filled and 64% of positions filled.
- The application numbers are similar to recent years if you consider that a handful of positions this year were available outside of the match.

3

The dates for the 2024 Forensic Pathology Fellowship Match for 2025 appointments are:

- Match Opens — February 7, 2024
- Ranking Opens — March 20, 2024
- Quota Deadline — April 3, 2024
- Ranking Closes — April 17, 2024
- Match Day — May 1, 2024

4

Survey of 2023 Applicants in FIRST Forensic Path MATCH

Jenna Aungst
OMS-II, Class of 2026
DeBusk College of Osteopathic Medicine
Lincoln Memorial University

5

Survey of 2023 Applicants in FIRST Forensic Path MATCH

- 25/45 Responses (55.5%)
- Age
  - 21-29: 9
  - 30-39: 16
- Sex
  - Male: 12
  - Female: 12
  - Non-Binary: 1

6

Survey of 2023 Applicants

- 4/25 will complete another fellowship prior to starting Forensic Fellowship (2 Neuro-Path, 1 PedPath).
- Completed Residencies: 2/3 AP/CP and 1/3 AP

7

Survey of 2023 Applicants

- Completed Graduate/Post-Graduate Training
  - Anatomic Pathology (AP): 7
  - Anatomic & Clinical Pathology (AP/CP) 14
  - Neuropathology Fellowship 2
  - Pediatric Pathology Fellowship 1
  - Master of Public Health 0

8

Survey of 2023 Applicants

- Medical school
  - U.S. or Canada osteopathic (DO) medical school 7
  - U.S. or Canada allopathic (MD) medical school 10
  - International Medical Graduate (IMG) 7

9

Survey of 2023 Applicants

- When did you decide to pursue a career in FP?
  - Medical school 8
  - Residency 8
  - High School 4
  - College 2
  - Graduate (non-medical school) degree 1
  - Elementary School 1

10

Survey of 2023 Applicants

- What medical school year did you decide to pursue a career in forensic pathology?
  - Year 1 1
  - Year 2 1
  - Year 3 2
  - Year 4 4

11

Survey of 2023 Applicants

- What residency year did you decide to pursue a career in forensic pathology?

PGY-1	1
PGY-2	6
PGY-3	1
PGY-4	0

12

Survey of 2023 Applicants

- How many programs interviewed you?

1	3
2-4	9
5-8	9
9-12	3
>12	1

13

Survey of 2023 Applicants

- How were the interviews conducted?

In-person	3
Virtual	7
In-person and virtual	15

- 2/17 received an interview travel stipend

14

Survey of 2023 Applicants

- How many Forensic Fellowship programs did you rank?

1	2
2-4	10
5-8	9
9-12	3
>12	1

15

Survey of 2023 Applicants

- 20/25 matched with their first rank
- 1/25 matched with their last choice

16

Survey of 2023 Applicants

- 23/25 wanted a set schedule of deadlines for applications and interviews.
- 22/24 want a centralized application (e.g., ERAS).
- 12/25 matched at a program at which they had done a rotation.
- 10/25 matched at a program in the same state as their residency.
- 2/25 matched at a program in the same state as their medical school.

17

If you were looking for a forensic pathology fellowship program within a particular geographic area, which did you prefer?

Mixed urban/rural	15
Urban	7
Rural	0
No preference	3

18

If you were looking for a forensic pathology fellowship program within a particular jurisdiction, which did you prefer?

State	5
City/County	5
No preference	15

19

Regarding the geographic location of your fellowship program, what was important (select all that apply)?

- A location where I hope to stay to live and work 14
- Close to family (i.e., within 100 miles) 7
- Near my spouse/significant other's home/work location 7
- Close to your residency program (i.e., within 100 miles) 6

20

If you were looking for a program in a particular geographic region, which did you prefer (select all that apply)?

- Midwest 11
- Northeast 9
- South 8
- Southwest 8
- West 4
- Northwest 4
- Mid-Atlantic 3
- No geographic preference 3

21

In deciding how to rank a program, scale of 1 (not important) to 5 (most important), how important were the following attributes:

- Quality of faculty 24 (4-5)
- Reputation of office 23 (4-5)
- Stability of office 23 (4-5)
- Geographic location of office 20 (4-5)
- Availability of court experience 20 (4-5)
- Structure of curriculum 19 (4-5)
- Opportunities for mentorship 17 (4-5)
- NAME accreditation of office 16 (4-5)
- Salary of fellows 16 (4-5)
- Program Director 15 (4-5)
- Average number of Cases per day 15 (4-5)

22

In deciding how to rank a program, scale of 1 (not important) to 5 (most important), how important were the following attributes:

- Number of fellows 14 (4-5)
- Opportunities for employment at office after training 14 (4-5)
- Spouse/significant other influence 13 (4-5)
- Talking with current/recent fellows 13 (4-5)
- Number of faculty 12 (4-5)
- Average number of homicides 11 (4-5)
- Availability of conference stipend 10 (4-5)
- Availability of supplies (i.e., laptop, book fund) 10 (4-5)

23

In deciding how you would rank a program, on a scale of 1 (not important) to 5 (most important), how important were the following attributes:

- Diversity of faculty 10 (4-5)
- Opportunities for research 9 (4-5)
- Cost of living 9 (4-5)
- Interview process 8 (4-5)
- Availability of rotations at other sites 5 (4-5)
- Availability of a private office 5 (4-5)
- Offers Forensic Fellow In-Service Exam (FISE) 3 (4-5)
- Diversity of fellows 3 (4-5)

24

Survey of 2023 Applicants

Are you satisfied with your Match outcome?

Definitely yes	22
Probably yes	0
Might or might not	0
Probably not	1
Definitely not	2

25

Survey of 2023 Applicants

Do you believe the Match made forensic pathology fellowship program selection less stressful than fielding multiple offers from different offices?

Definitely yes	5
Probably yes	4
Might or might not	5
Probably not	6
Definitely not	5

26

Survey of 2023 Applicants

Do you think the Match is fairer than not having a Match?

Definitely yes	6
Probably yes	13
Might or might not	4
Probably not	1
Definitely not	1

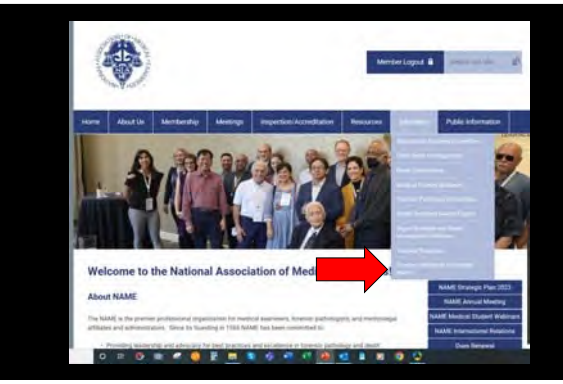
27

28

Proposals

- Uniform Timeline
- Standard application process (EPAS?) and "interview season."
- Fellowship program fair at NAME meeting
- Interview Guidelines (ACGME)
- APC: Combined subspecialty fellowship match?
- ACGME Accreditation Status

29



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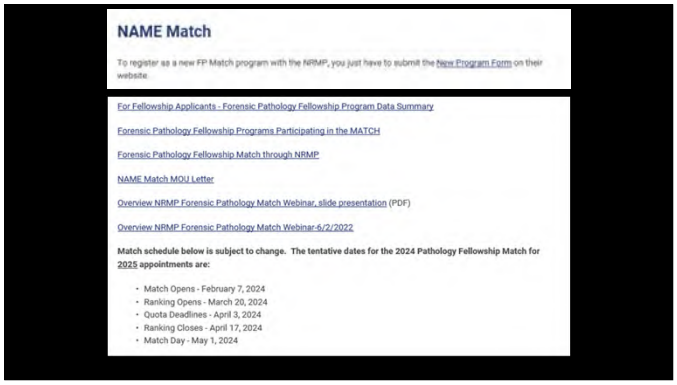

NAME Match
To register as a new FP Match program with the NRMP, you just have to submit the New Program Form on their website.
For Fellowship Applicants - Forensic Pathology Fellowship Program Data Summary
Forensic Pathology Fellowship Programs Participating in the MATCH
Forensic Pathology Fellowship Match through NRMP
NAME Match MOU Letter
Overview NRMP Forensic Pathology Match Webinar, slide presentation (PDF)
Overview NRMP Forensic Pathology Match Webinar-6/2/2022
Match schedule below is subject to change. The tentative dates for the 2024 Pathology Fellowship Match for 2025 appointments are:
Match Opens - February 7, 2024
Ranking Opens - March 20, 2024
Quota Deadlines - April 3, 2024
Ranking Closes - April 17, 2024
Match Day - May 1, 2024

31


Consortium of Forensic Science Organizations (CFSO)
NAME Update 2023

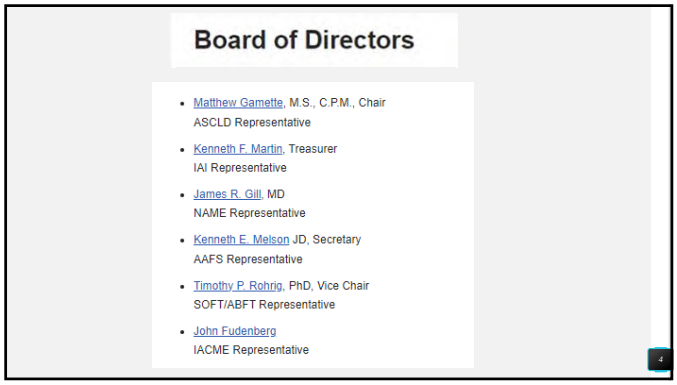
1


Consortium of Forensic Science Organizations (CFSO)
AAFS
ASCLD
IACME
IAI
NAME
SOFT/ABFT
The mission of the CFSO is to speak with a single voice in matters of forensic science of mutual interest of its member organizations, to influence public policy at a national level, and to make a compelling case to increase federal resources for publicly funded forensic service providers. The primary focus of the CFSO is local, county, state, and federal policymakers, as well as the United States Congress.

2


CFSO
The Consortium of Forensic Science Organizations
https://thecfso.org/

3


Board of Directors
Matthew Gamette, M.S., C.P.M., Chair
ASCLD Representative
Kenneth F. Martin, Treasurer
IAI Representative
James R. Gill, MD
NAME Representative
Kenneth E. Melson JD, Secretary
AAFS Representative
Timothy P. Rohrig, PhD, Vice Chair
SOFT/ABFT Representative
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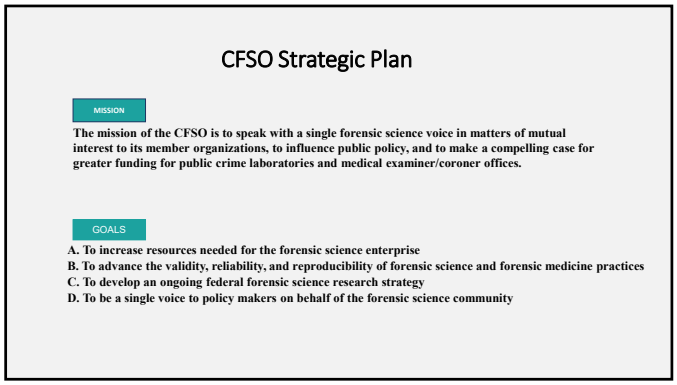
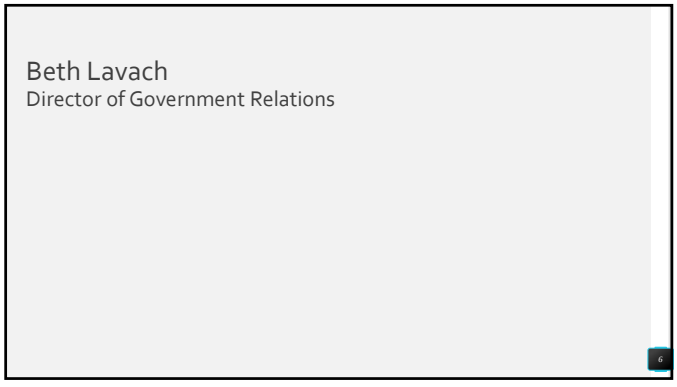
IACME Representative
4

4


CFSO Strategic Plan
MISSION
The mission of the CFSO is to speak with a single forensic science voice in matters of mutual interest to its member organizations, to influence public policy, and to make a compelling case for greater funding for public crime laboratories and medical examiner/coroner offices.
GOALS
A. To increase resources needed for the forensic science enterprise
B. To advance the validity, reliability, and reproducibility of forensic science and forensic medicine practices
C. To develop an ongoing federal forensic science research strategy
D. To be a single voice to policy makers on behalf of the forensic science community

5


Beth Lavach
Director of Government Relations
6

6

COLLEGE of AMERICAN PATHOLOGISTS

Updates from CAP Autopsy and Forensic Committees

Meagan A. Chambers, MD, MS, MSc, FCAP
Michelle B. Aurelius, MD, FCAP

Meagan X. Chambers, MD, MS, MSc, FCAP
Michelle B. Aurelius, MD, FCAP

October 16, 2023

1

Forensic Committee - Charge

To recognize and meet the needs of the pathologist and pathology with regard to forensic casework; to advance forensic pathology, medicine and science through education, provision of Survey Programs, advocacy and other means; to serve as a liaison between the CAP and forensic community.

2

Recognize needs of FP Casework

from the President's Desk

Emily E. Volk, MD

Forensic pathology's fate matters to all

Whether you watched *Quincy, M.E.*, like I did as a kid, or something more recent like *CSI*, many of us encountered pathology for the first time through a TV show. Watching Jack Klugman's weekly adventures as the L.A. county medical examiner, Dr. Quincy, certainly had me intrigued about the specialty of pathology. While most of us work in clinical or anatomic pathology instead of subspecializing in forensic pathology, it's the forensics field—and how it's portrayed in TV and movies—that gives most of the general public the only insight into pathology they get in their daily lives. When people outside the medical field hear about a pathologist, they typically picture someone performing an autopsy and trying to

there are just 400 to 500 full-time practicing forensic pathologists in the U.S., less than half of the 1,200 experts needed.

This shortage comes as no surprise to us. After all, less than one percent of medical school graduates pursue pathology in general, and only a small fraction of those choose to specialize in forensic pathology. A 2020 publication in the *American Journal of Forensic Medical Pathology* from Victor Weedn, MD, and M.J. Mirenda said that there were only 36 forensic pathology fellows in the U.S. in 2019.

Some of this trend has been attributed to a dramatic decline in hospital autopsies. According to that 2020 publication, autopsy rates have

tive information available to the criminal justice system as possible, and that is what forensic pathologists are trained to deliver.

And from a professional perspective, clinical and anatomic pathologists practicing in any number of different clinical settings should very much care about the fate of our colleagues in forensic pathology. We have seen this in other areas in medicine already: If there aren't enough experts to perform important work, there will be a push to fill that gap some other way—often by reducing the qualifications needed to do it. We run the risk of having people with insufficient training assigned to perform forensic pathologist work. It is yet another threat to the scope of practice in pathology.

This kind of work goes well beyond findings related to any single death. Forensic pathologists have a huge role to play in public health. During pandemics, their expertise is critical to identifying trends about how people are dying. Their analyses during the COVID-19 pandemic about what the virus was doing to the bodies of its victims were essential in helping other medical professionals learn how to care for patients more effectively to

3

Advance through Advocacy

What it's like in forensic pathology: Shadowing Dr. Gill

James R. Gill, MD, FCAP, a forensic pathologist, is featured in the AMA's

AMA: What it's like in forensic pathology: Shadowing Dr. Gill

James R. Gill, MD, FCAP, a forensic pathologist, is featured in the AMA's

Forensic pathologist shortage fueling autopsy backlogs

CNN: US monkeypox deaths are rare; here's why they can be difficult to confirm

James Gill, MD, FCAP

Experts Question the Role of White Mulberry in the Death of Congressman's Wife

29 September 2023 4

4

Advance through Education

- The Forensic Pathology Program (FR)
  - Two online activities per year, 5 cases each
  - Pathologists, forensic pathologists, residents, fellows, ME/coroners, investigators, analysts, techs
  - Up to 12.5 CME
- Handbook of Forensic Pathology
- Cause of Death and the Death Certificate
- Family's Guide to DC

A Family's Guide to Death Certificates

When a loved one passes away, one of the most important documents a family will need is the death certificate. Understanding death certificates can save time and undue stress when the time comes.

Read More ›

29 September 2023 5

5

Advance through Education: Podcast & Scholarship

Forensic Pathologists React to "Body of Proof"

CAPcast from the College of American Pathologists

Listen on Apple Podcasts ↗

Forensic Pathologists React to "Psych"

CAPcast from the College of American Pathologists

Listen on Apple Podcasts ↗

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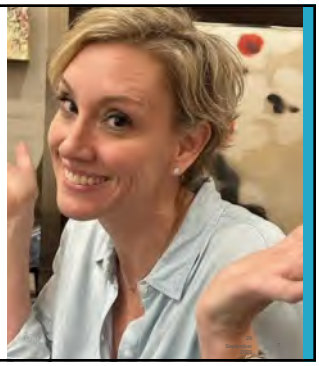
6

Forensic Advanced Training Grant

in Memory of Dr. Beth Frost



29 September 2023

7

Forensic Advanced Training Grant *in Memory of Dr. Beth Frost*

- Pathology resident travel grants x2
  - $5,000 each
  - Donate CAP website (QR Code Insert)
- 2023 pilot grant cycle
  - Rotations completed by 12/31/23
- 2024 grant schedule
  - Collect donations ($10,000 for two)
  - March – April: Solicitation and application acceptance
  - July: Award
  - September – December: completion of rotations

29 September 2023 8

8

Autopsy Committee - Charge

To help define and monitor the state of the art of autopsy pathology; to improve the performance and reporting of the autopsy; to promote utilization of the autopsy for quality improvement, research, education and public health; to contribute to the continuing education of CAP members and the larger medical community through the creation of surveys, publications, and educational seminars; to provide consultative service to all areas of the College as needed for activities, regulations, and legislation related to the autopsy.

29 September 2023 9

9

Autopsy Committee Slides

- **Past projects:**
  - Special autopsy dissections
  - Autopsy Performance and Reporting
- **Current projects:**
  - The Autopsy Pathology Program (AUP) offers pathologists the opportunity to obtain 12.5 hours of continuing medical education (CME) per year while developing and maintaining proficiency in autopsy pathology
  - CAP autopsy reporting protocol
  - Normal organ weights at autopsy

10

Autopsy Reporting Template

COLLEGE of AMERICAN PATHOLOGISTS

Reporting Protocol for the Examination of Gross Autopsy of Adult Decedents

Version: autopsy-adult-20.02
Protocol Posting Date: February 2020

- https://www.cap.org/member-resources/councils-committees/autopsy-topic-center
  - https://documents.cap.org/protocols/ap-autopsy-adult-20-02.pdf
  - **(Or Google "CAP Autopsy Toolbox")**

11

Autopsy Reporting Template

PRIOR POSTMORTEM PROCEDURES

___ **Organ Donation (select all that apply)**
- ___ Corneas
- ___ Skin
- ___ Bone and soft tissue (specify): _____
- ___ Organs (specify): _____
- ___ Other (specify): _____

EXTERNAL APPEARANCE

BMI _____
Note: use formula weight (kg)/ [height (m)]2

___ **Personal effect with or on the body**
- ___ No
- ___ Yes (specify): _____

___ **Toes / fingernails:**
- ___ Unremarkable
- ___ Onychomycosis
- ___ Koilonychia
- ___ Splinter hemorrhages
- ___ Cyanotic
- ___ Other (specify): _____

___ **Leg circumference 10 cm from medial malleolus**
- ___ Right (centimeters): _____ cm
- ___ Left (centimeters): _____ cm

CARDIOVASCULAR SYSTEM

___ **Heart weight**
- ___ (grams): _____ g

Note: see reference table by patient weight

___ **Pericardium**
- ___ Intact
- ___ Adhesions
- ___ No adhesions
- ___ Other (specify): _____

AUTOPSY PROCEDURES AND ANCILLARY TESTING

___ **Approach to autopsy dissection**
- ___ Rokitansky
- ___ Virchow
- ___ Other (specify): _____

___ **Special dissection**
- ___ None
- ___ Other (specify): _____

___ **Tissue retention**
- ___ Stock jar
- ___ All organs (until signout)
- ___ Other (specify): _____

___ **Additional samples taken**
- ___ Blood (specify): _____
- ___ Vitreous
- ___ Tissue (specify): _____
- ___ Other (specify): _____

12

Normal Organ Weights at Autopsy

Updating Normal Organ Weights Using a Large Current Sample Database

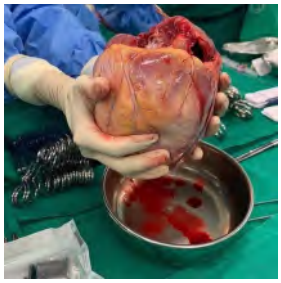
Michael D. Bell, MD; Thomas Long, MPH; Anja C. Roden, MD; Felicia I. Cooper, MD; Harold Sanchez, MD; Carrie Trower, PA(ASCP); Christine Martinez, PA(ASCP); Jody E. Hooper, MD; on behalf of the Autopsy Committee of the College of American Pathologists

PMID: 35344994

13

Prior Studies

- Old literature
  - *Methodological concerns*
  - *Change in body habitus*
- Source of data (hospital, asylum, vs. forensics)
- Sample size



14

Connolly et. al – Autopsy Pathology

Organ	Citation	n	Metric
Liver	de la Grandmaison 2001	684	height/BMI
	Bean and Baker 1919	103	
Kidney	de la Grandmaison 2001	684	height/BMI
	Wald 1937	414	age
Lungs	Whimster 1974	802	
	de la Grandmaison 2001	684	
Heart	de la Grandmaison 2001	684	height/BMI
	Zeek 1942	933	height
Spleen	de la Grandmaison 2001	684	height/BMI
Pancreas	de la Grandmaison 2001	684	height/BMI
Brain	Dekaban 1978	3399	age
	Bischoff 1880	886	age
Thyroid	de la Grandmaison 2001	684	height/BMI
Adrenal	Bloodworth 1966	318	
	Leupold 1920	51	height

PROs:
- Overall, studies are forensic based with some inclusion/exclusion criteria for normal cases

CONs:
- Age of studies
- Small sample sizes (only 3 organs with n ≥1000)
- Limited diversity/generalizability
- Poor data quality for adrenals and brain

15

Waters et. al – Handbook of Autopsy Practice

Organ	Citation	n	Metric
Liver	de la Grandmaison 2001	684	height/BMI
Kidney	de la Grandmaison 2001	684	height/BMI
	Wald 1937	414	age
Lungs	Saunderman 1947		
	de la Grandmaison 2001	684	
Heart	de la Grandmaison 2001	684	height/BMI
	Kitzman 1988	756	Body weight
Spleen	de la Grandmaison 2001	684	height/BMI
	Myers and Segal 1974	366	age
Pancreas	de la Grandmaison 2001	684	height/BMI
	Saunderman 1947		
Brain	Bischoff 1880	886	age
Thyroid	de la Grandmaison 2001	684	height/BMI
	Saunderman 1947		
Adrenal	Leupold 1920	51	height

PROs:

- Does include heart weight by body weight table

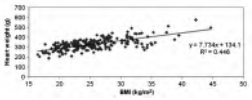
CONs:

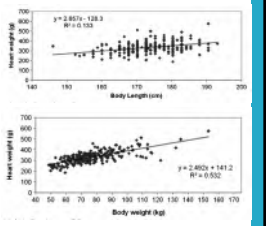
- Does not combine studies (smaller sample size: all organs n = <1000)
- Brain/adrenal data less reliable

16

Molina and DiMaio (2012 and 2015)

- 4 publications collectively covering heart, brain, lungs, liver, spleen, and kidneys in females and males
- Forensic cases
- n = 232



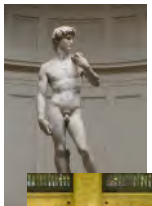


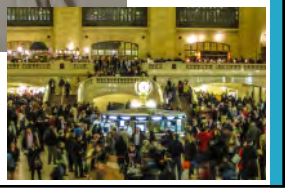
17

Design

Adults who came to autopsy at the Palm Beach Medical Examiner (2009-2017) or the Mayo Clinic (2013-2014)

- Ambulatory adult population
- No history or gross evidence of disease that would affect organ weight
- No cutoffs for age, height, weight, or body mass index
- Result: broad generalizability





18

Material and Methods

Exclusion criteria:

- Severe injury
- Exsanguination as major contributor to death
- Decomposition: PMI >24 hrs
- Hospitalized for >2 days prior to death
- Gross organ pathology (take out that organ)

Finding	Eliminate
Hypertension (systemic or pulmonary)	Heart & Kidneys
Heart Disease	Heart
Opiate Overdose	Lungs
Cocaine/Amphetamine Overdose	Heart & Kidneys
Body in Water	Lungs
Cirrhosis	Liver & Spleen
Pneumonia	Lungs
Cerebral Edema/Ischemia	Brain
Dementia	Brain
Chronic Alcohol/IV Drug Use	Liver

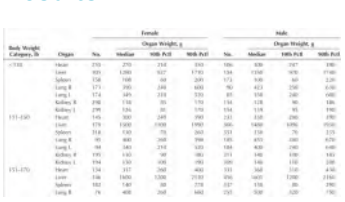
19

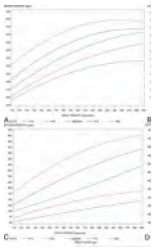
Results

- 4197 adults
  - Men:Female: 7 : 2.6
- All data divided by sex
  - Data for brain weight further grouped by age
  - Data for other organs further grouped by weight
- Total of 26 cells
  - All cells had at least 75 data points except women 211-230 pounds

20

Results





21

Organ weight digital tool

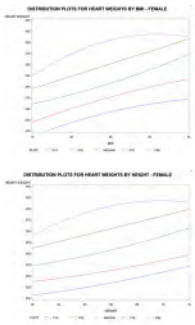
organweights.theautopsybook.com

22

Future Directions

- More data
- Better diversity in terms of SES, race, geography, and body size
- BMI and height indexing

Contact: MeaganMD@uw.edu



23

Summary – Forensic and Autopsy Committees

- **Education, Advocacy, Research, Improvements**
  - **Projects**
  - **Publications**
  - **Resources**
- **Get involved!**
  - **CAP Fellows and Junior Members**
  - **Also those not eligible for CAP membership including PhDs, technologists, applicable experts**
  - **Application open January 9, 2023, close April 28, 2023**
  - **Members evaluated every year, up to 6 years**

24

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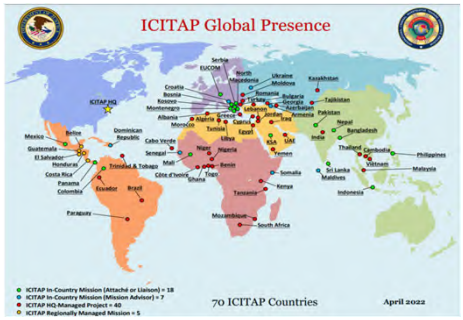
U.S. Department of Justice
Criminal Division
International Criminal Investigative Training Assistance Program

International Cooperation Supporting the Development of Forensic Science

1

ICITAP at a Glance

ICITAP Global Presence



2

Forensic Science is E[illegible]al to Intern[illegible]aw E[illegible]

Direct applications
- Homicide
- Sexual assault
- Drug trafficking
- Missing persons
- Terrorism
- Cybercrimes
- Human rights and mass graves
- Mass disasters

Indirect benefits
- Transparency of evidence-based convictions
- Public confidence in the rule of law

3

4

5

ICITAP-supported Countries with Accredited Laboratories

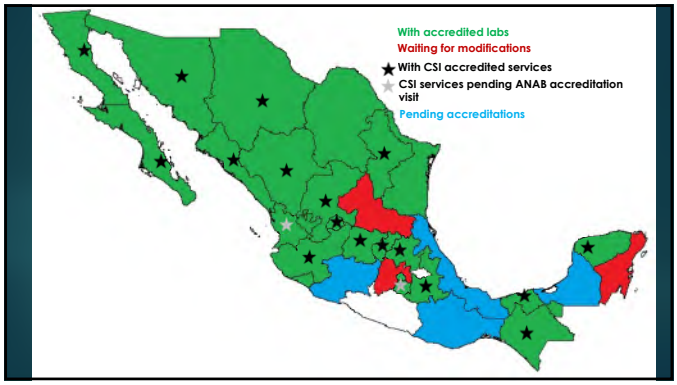
Algeria
Brazil
Bulgaria
Costa Rica
Colombia
Egypt
Indonesia
Panama
Philippines
Kosovo
Mexico
Morocco
North Macedonia
Tanzania
Ukraine
Uzbekistan

Accredited Laboratory Sections

DNA
Chemistry
Firearms
Fingerprints
Questioned Documents
Digital Evidence
Toxicology
Crime Scene
Anthropology
Medicolegal Death Investigations

QUALITY MANAGEMENT SYSTEM
ISO 17025
ACCREDITED
LABORATORY

6



7

Costa Rica Lean Six Sigma Project - Impact on Backlog
Reduced cases in the laboratory over 90 days by 95%

8

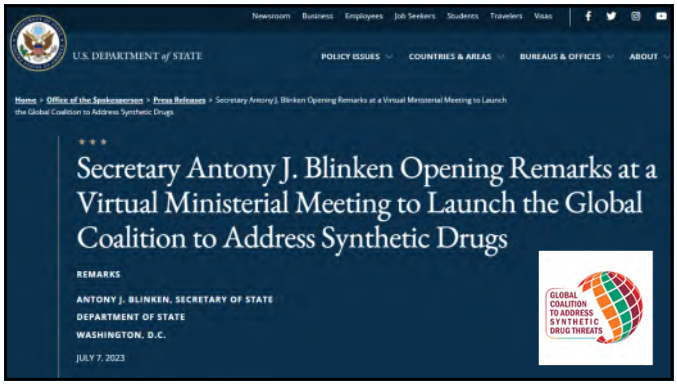
Strategic Approach to Supporting Accreditation Internationally

1. Simplify the process, maintain the rigor
2. Focus on our peer relationship
   - We are not exporting American standards rather the consensus of the international community
3. Promote partner successes
   - Use our partners as role models
   - Build a forensic community through regional forums such as the Mexico's International Forensic Symposium and the Central American Regional Symposium
   - Develop qualified accreditation assessors

9


ARKANSAS
STATE
CRIME
LAB
Observerships for Mexican Pathologists

10


U.S. DEPARTMENT of STATE
POLICY ISSUES
COUNTRIES & AREAS
BUREAUS & OFFICES
ABOUT
Secretary Antony J. Blinken Opening Remarks at a Virtual Ministerial Meeting to Launch the Global Coalition to Address Synthetic Drugs
REMARKS
ANTONY J. BLINKEN, SECRETARY OF STATE
DEPARTMENT OF STATE
WASHINGTON, D.C.
JULY 7, 2023
GLOBAL COALITION TO ADDRESS SYNTHETIC DRUG THREATS

11


New Opioid Project in Mexico
UNITED STATES OF AMERICA
Gulf of Mexico
NORTH
PACIFIC
OCEAN
BELIZE
GUATEMALA

12

Regional Assessment in the Balkans

13

14

Contact Information

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International Criminal Investigative Training Assistance Program (ICITAP)
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15

The Accreditation Council for Graduate Medical Education (ACGME) Forensic Pathology Fellowship Milestones: A Fellow's Perspective

Deland Weyrauch, M.D.
Deputy Medical Examiner
Montana State Medical Examiner's Office

Maura DeJoseph, D.O.
Deputy Chief Medical Examiner
Connecticut Office of Chief Medical Examiner

1

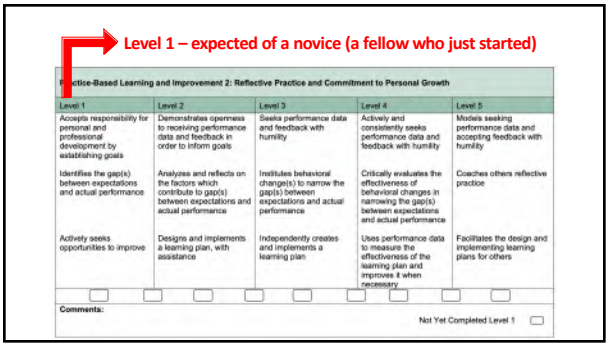
- Conflicts of Interest:
  - None.
- Special Qualifications to Give this Talk:
  - None.

2

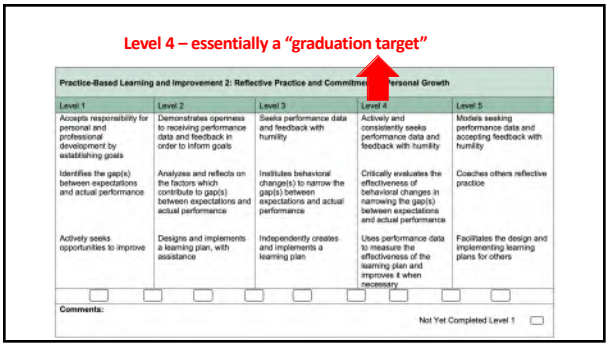
What are the Milestones?

- The ACGME has Milestones for each medical specialty, including forensic pathology
- Newest version (Milestones 2.0) for FP approved in 2020
  - First reporting period due in 2022
- Major goal: help create competent, high-quality forensic pathologists by establishing agreed-upon, significant points in development that can be progressively demonstrated throughout the fellowship year

3


Level 1 – expected of a novice (a fellow who just started)
Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth
Level 1
Level 2
Level 3
Level 4
Level 5
Accepts responsibility for personal and professional development by establishing goals
Demonstrates openness to receiving performance data and feedback in order to inform goals
Seeks performance data and feedback with humility
Actively and consistently seeks performance data and feedback with humility
Models seeking performance data and accepting feedback with humility
Identifies the gap(s) between expectations and actual performance
Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance
Institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance
Critically evaluates the effectiveness of behavioral changes in narrowing the gap(s) between expectations and actual performance
Coaches others reflective practice
Actively seeks opportunities to improve
Designs and implements a learning plan, with assistance
Independently creates and implements a learning plan
Uses performance data to measure the effectiveness of the learning plan and improves it when necessary
Facilitates the design and implementing learning plans for others
Comments:
Not Yet Completed Level 1

4


Level 4 – essentially a "graduation target"
Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth
Level 1
Level 2
Level 3
Level 4
Level 5
Accepts responsibility for personal and professional development by establishing goals
Demonstrates openness to receiving performance data and feedback in order to inform goals
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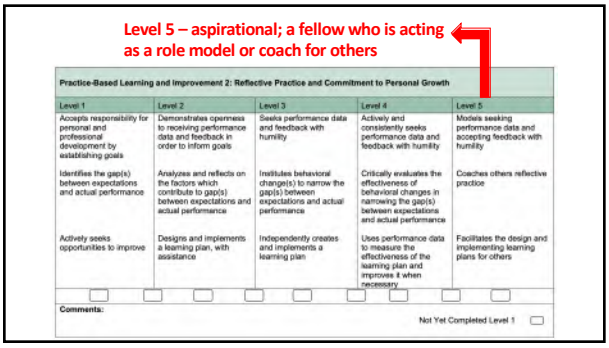
Comments:
Not Yet Completed Level 1

5


Level 5 – aspirational; a fellow who is acting as a role model or coach for others
Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth
Level 1
Level 2
Level 3
Level 4
Level 5
Accepts responsibility for personal and professional development by establishing goals
Demonstrates openness to receiving performance data and feedback in order to inform goals
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Facilitates the design and implementing learning plans for others
Comments:
Not Yet Completed Level 1

6

Why Give this Talk?

- The Milestones **do not dictate which fellows graduate** and which do not
  - No "required minimum scores"
  - Readiness ultimately determined by program director
- So, much of their utility is helping fellows better understand themselves and their relationship to the field's expectations

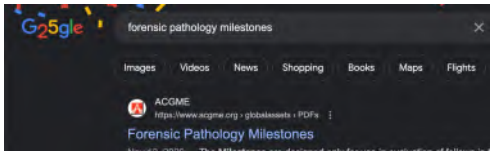
7

Why Give this Talk?

- Many fellows may not take time to read and reflect upon the Milestones, and busy program faculty/instructors may overlook them as merely another time-consuming checkbox item
- I will present selected experiences to try to illustrate these points in development

8

Search "forensic pathology milestones"…



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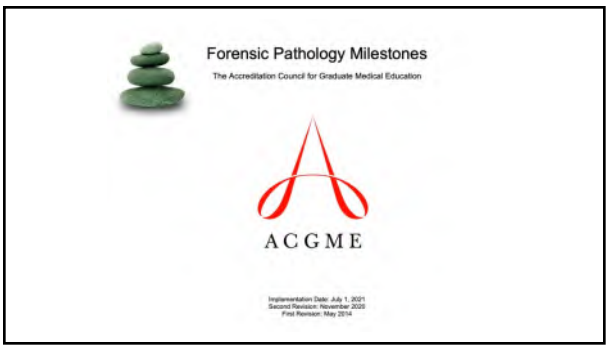

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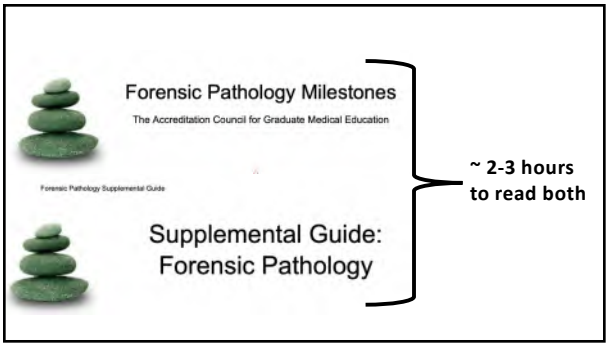

11

Based on my experience…

- As a fellow, reading the Milestones makes you **acutely aware** of areas where you feel uncomfortable
- Imparts self-awareness and desire to gain experiences in these areas of weakness

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Forensic Pathology Milestones Work Group

Nicholas Batalis, MD
Erin Brooks, MD
Shannon Crook, MD
Nicole Croom, MD, MPH
Laura Edgar, EdD, CAE
Jennifer Hammers, DO
Julie Huss-Bawab, MD
Bruce Levy, MD
Reade Quinton, MD
Barbara Sampson, MD, PhD
Allecia Wilson, MD

13

FP milestone summary

Patient Care	Medical Knowledge	Systems-Based Practice
• Death Investigation • Autopsy	• Death Certification and Reporting • Recognition and Interpretation of Autopsy Findings and Ancillary Studies • Clinical Reasoning	• Safety and Quality Improvement • Systems Navigation for Patient-Centered Care • Physician Role in Health Care System • Accreditation, Compliance, and Quality • Utilization

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FP milestone summary

Practice-Based Learning and Improvement	Professionalism	Interpersonal and Communication Skills
• Evidence-Based Practice and Scholarship • Reflective Practice and Commitment to Personal Growth	• Professional Behavior and Ethical Principles • Accountability and Conscientiousness • Self-Awareness and Help-Seeking	• Family-Centered Communication • Interprofessional and Team Communication • Systems Communication • Medicolegal Communication

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In Essence…

- **What do you know?**
  - Medical Knowledge (3 milestones)
  - Systems-Based Practice (5 milestones)

  8 milestones
- **What can you do?**
  - Patient Care (2 milestones)

  2 milestones
- **How do you conduct yourself?**
  - Practice-Based Improvement (2 milestones)
  - Professionalism (3 milestones)
  - Interpersonal Communication Skills (4 milestones)

  9 milestones

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FP milestone summary

Practice-Based Learning and Improvement	Professionalism	Interpersonal and Communication Skills
• Evidence-Based Practice and Scholarship • Reflective Practice and Commitment to Personal Growth	• Professional Behavior and Ethical Principles • Accountability and Conscientiousness • Self-Awareness and Help-Seeking	• Family-Centered Communication • Interprofessional and Team Communication • Systems Communication • Medicolegal Communication

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Professionalism 3: Self-Awareness and Help-Seeking

Level 1	Level 2	Level 3	Level 4	Level 5
Recognizes limitations in the knowledge/skills/ behaviors of self or team, with assistance	Independently recognizes limitations in the knowledge/skills/ behaviors of self or team and seeks help when needed	Proposes and implements a plan to remediate or improve the knowledge/ skills/behaviors of self or team, with assistance	Independently develops and implements a plan to remediate or improve the knowledge/skills/ behaviors of self or team	Serves as a resource or consultant for developing a plan to remediate or improve the knowledge/ skills/behaviors
Recognizes status of personal and professional well-being, with assistance	Independently recognizes status of personal and professional well-being and seeks help when needed	Proposes and implements a plan to optimize personal and professional well-being, with assistance	Independently develops and implements a plan to optimize personal and professional well-being	Coaches others when responses or limitations in knowledge/skills do not meet professional expectations

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Rules-Driven → **Able to handle complexity and nuance**

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Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth

Level 1	Level 2	Level 3	Level 4	Level 5
Accepts responsibility for personal and professional development by establishing goals	Demonstrates openness to receiving performance data and feedback in order to inform goals	Seeks performance data and feedback with humility	Actively and consistently seeks performance data and feedback with humility	Models seeking performance data and accepting feedback with humility
Identifies the gap(s) between expectations and actual performance	Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance	Institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance	Critically evaluates the effectiveness of behavioral changes in narrowing the gap(s) between expectations and actual performance	Coaches others reflective practice
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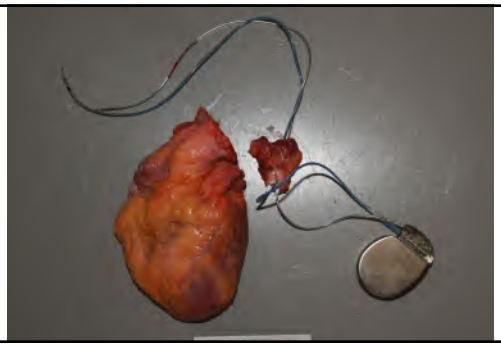

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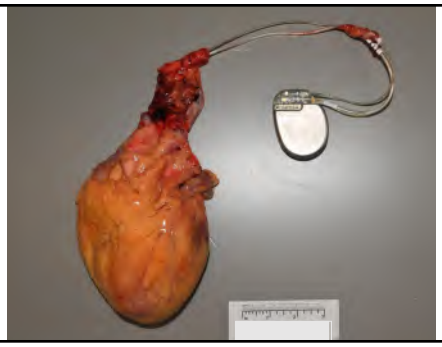

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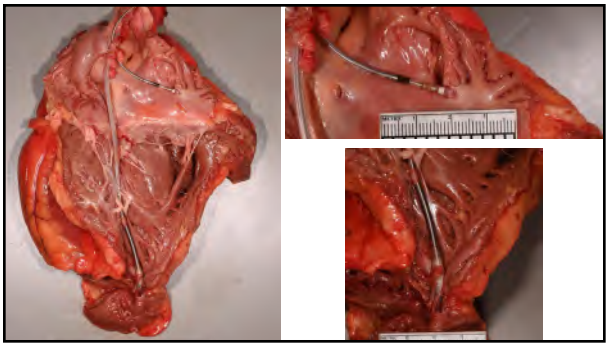


23

Acquisition and Maintenance of Medical Expertise: A Perspective From the Expert-Performance Approach With Deliberate Practice

K. Anders Ericsson, PhD

Abstract

Perception in Chess[1]

William G. Chase and Herbert A. Simon

Carnegie-Mellon University

> J Couns Psychol. 2016 Jan;63(1):1-11. doi: 10.1037/cou0000131.

Do psychotherapists improve with time and experience? A longitudinal analysis of outcomes in a clinical setting

Simon B Goldberg [1], Tony Rousmaniere [2], Scott D Miller [3], Jason Whipple [4], Stevan Lars Nielsen [5], William T Hoyt [6], Bruce E Wampold [6]

24

Forensic Pathology Supplemental Guide

Uses performance data to measure the effectiveness of the learning plan and improves it when necessary	• Reflects on own performance and makes request for specific types of cases
Level 5 *Models seeking performance data and accepting feedback with humility*	• Actively discusses learning goals with supervisors and colleagues; may encourage other learners on the team to consider how their behavior affects the rest of the team

Comfort is the enemy of improvement

25

In my experience…

- Go out of your way to seek feedback
  - **"How could I have been a better fellow today?"**
- When given feedback
  - "How do you think I can make these changes?"

26

Professionalism 2: Accountability and Conscientiousness

Overall Intent: To take responsibility for one's own actions and the impact on decedents, families, and other members of the team

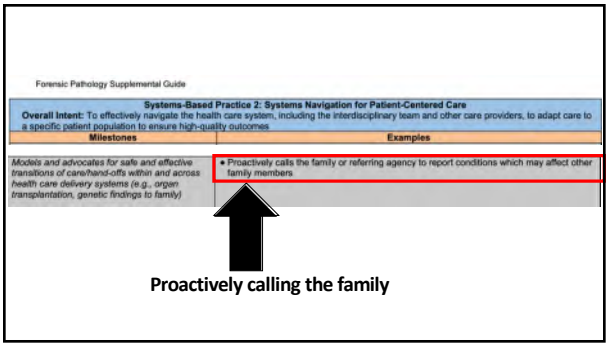
Milestones	Examples
Level 4 *Anticipates and intervenes in situations that may impact others' ability to complete tasks and responsibilities in a timely manner*	• Identifies issues that could impede other fellows from completing tasks and provides leadership to address those issues; escalates to communicating with program director if problem requires a system-based approach and needs addressing at a higher administrative level • Takes responsibility for potential adverse outcomes from mishandled specimen and professionally discusses with the interprofessional team

"Takes responsibility for potential adverse outcomes from mishandled specimen"

27


TED
SIGN IN
Doctors make mistakes. Can we talk about that?
1,800,071 views | Brian Goldman • TEDxToronto ...

28


Forensic Pathology Supplemental Guide
Systems-Based Practice 2: Systems Navigation for Patient-Centered Care
Overall Intent: To effectively navigate the health care system, including the interdisciplinary team and other care providers, to adapt care to a specific patient population to ensure high-quality outcomes
Milestones
Examples
Models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems (e.g., organ transplantation, genetic findings to family)
• Proactively calls the family or referring agency to report conditions which may affect other family members
Proactively calling the family

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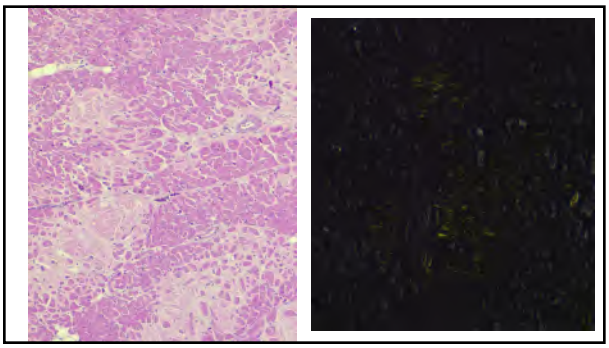

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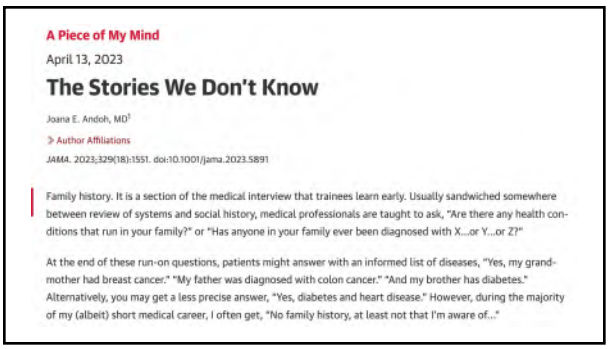

A Piece of My Mind

April 13, 2023

The Stories We Don't Know

Joana E. Andoh, MD[1]

> Author Affiliations

JAMA. 2023;329(18):1551. doi:10.1001/jama.2023.5891

Family history. It is a section of the medical interview that trainees learn early. Usually sandwiched somewhere between review of systems and social history, medical professionals are taught to ask, "Are there any health conditions that run in your family?" or "Has anyone in your family ever been diagnosed with X…or Y…or Z?"

At the end of these run-on questions, patients might answer with an informed list of diseases, "Yes, my grandmother had breast cancer." "My father was diagnosed with colon cancer." "And my brother has diabetes." Alternatively, you may get a less precise answer, "Yes, diabetes and heart disease." However, during the majority of my (albeit) short medical career, I often get, "No family history, at least not that I'm aware of…"

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"Yet the answers to family history will go on to help risk stratify patients, perhaps implement earlier diagnostic screening, and **ultimately even raise or lower a clinician's suspicion for further workup**."

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Original Article

Seven factors predict a delayed diagnosis of cardiac amyloidosis

Eve Bishop, Emily E. Brown, Johana Fajardo, Lili A. Barouch, Daniel P. Judge & Marc K. Halushka

Pages 174-179 | Received 11 Apr 2018, Accepted 06 Jul 2018, Published online: 31 Aug 2018

Cite this article https://doi.org/10.1080/13506129.2018.1498782

blood ISSUES FIRST EDITION ABSTRACTS COLLECTIONS AUTHOR

651 MYELOMA: BIOLOGY AND PATHOPHYSIOLOGY, EXCLUDING THERAPY | NOVEMBER 13, 2019

Diagnostic Delay and Characterization of the Clinical Prodrome in AL Amyloidosis: Data from 1,313 US Commercially Insured Patients between 2006-2018

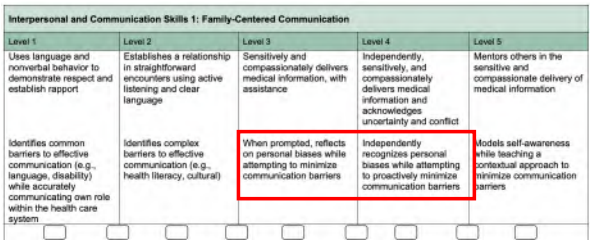
Laura J. Hester, PhD MSc, Dina M Gifkins, PhD MPH, Kevin M Bellew, MS, MA, Jessica Vermeulen, MD PhD, Jordan M Schecter, MD, Frank J DeFalco, Brendan M Weiss, MD

Check for updates

Blood (2019) 134 (Supplement_1): 651

https://doi.org/10.1182/blood-2019-124250

33



Interpersonal and Communication Skills 1: Family-Centered Communication				
Level 1	Level 2	Level 3	Level 4	Level 5
Uses language and nonverbal behavior to demonstrate respect and establish rapport	Establishes a relationship in straightforward encounters using active listening and clear language	Sensitively and compassionately delivers medical information, with assistance	Independently, sensitively, and compassionately delivers medical information and acknowledges uncertainty and conflict	Mentors others in the sensitive and compassionate delivery of medical information
Identifies common barriers to effective communication (e.g., language, disability) while accurately communicating own role within the health care system	Identifies complex barriers to effective communication (e.g., health literacy, cultural)	When prompted, reflects on personal biases while attempting to minimize communication barriers	Independently recognizes personal biases while attempting to proactively minimize communication barriers	Models self-awareness while teaching a contextual approach to minimize communication barriers

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In my experience…

- Best to wait to talk to the family if:
  - You're pressured for time
  - You're hungry
  - You've just been biased to view the decedent/family negatively

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"Listen to your patient; he is telling you the diagnosis."

- Sir William Osler

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Additional Resources and Links

- **Milestones Guidebook for Residents and Fellows (2020)**
  - Written by ACGME's Milestones Development Working Groups
  - Pertain to Milestones for all medical specialties
  - https://www.acgme.org/globalassets/PDFs/Milestones/MilestonesGuidebookforResidentsFellows.pdf?ver=2020-05-08-152434-750&ver=2020-05-08-152434-750
- **Frequently Asked Questions about the Milestones**
  - https://www.acgme.org/globalassets/milestonesfaq.pdf
- **Full PDF of the Current Forensic Pathology Milestones**
  - https://www.acgme.org/globalassets/pdfs/milestones/forensicpathologymilestones.pdf
- **Full PDF of the Current Forensic Pathology Milestones Supplemental Guide**
  - https://www.acgme.org/globalassets/pdfs/milestones/forensicpathologysupplementalguide.pdf
- **AJFMP Journal Article**
  - Forensic Pathology Working Group. Updates in Forensic Pathology Education: ACGME Milestones 2.0. *Am J Forensic Med Pathol.* 2021;42(4):313-317.

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Benzonatate Toxicology and Toxicity: "Perles" of Wisdom for the Forensic Pathologist.

Candace H. Schoppe, MD
Deputy Medical Examiner
San Diego County Office of the Medical Examiner

1

Probative Case

2

Big problem in a small package?

Public health

3

Cold and Cough Medicine

- Decongestants
- Cough Suppressants
- Expectorants
- Antihistamines
- Pain relivers

4

Cough Suppressants

Narcotic

- Codeine, others

Nonnarcotic

- Benzonatate

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Unintended Consequences

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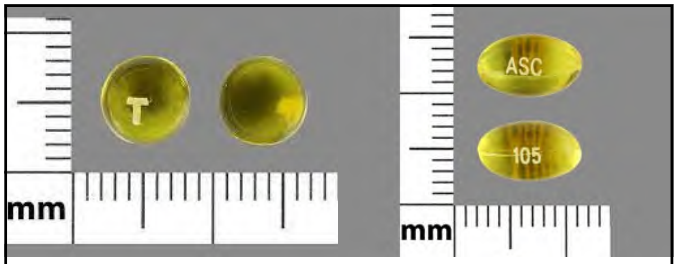

Size **Doesn't** Matter

7

History

- FDA approved as anti-tussive since 1950s
- Approval before mechanism of action fully known
- Prescription-only, brand and generic
- Not approved for children less than 10 years of age
- Little actual research

8

Preparations

- Small liquid gel capsules
- Resemble candy, over-the-counter medications (Vitamin D3)
- Heterogeneous mixture of polyethoxy compounds
- 100 mg, 150 mg, 200 mg:
  - Max, individual dose: 200 mg
  - Max, daily dose 600 mg
- ***NARROW MARGIN OF SAFETY!***

9

Pharmacology

- Related to ester-type local anesthetics → Numbing on contact
- Peripherally-acting →Bronchial smooth muscle
- Gastric absorption → lungs
- Inhibits pulmonary stretch receptors → Voltage-gated sodium channel inhibitor
- ***NARROW MARGIN OF SAFETY!***

10

Toxicology – Analytically Challenging

- Toxic at low doses
- Rapid hydrolysis
- Active metabolite difficult to identify:
  - GCMS run time longer than standard runs
  - Not typically detected as incidental peak in standard run
  - Standards not available for analysis

11

Risks Associated with Benzonatate

- Direct:
  - Toxic at low dose if chewed, high dose if swallowed:
    - Bronchospasm
    - Cardiac conduction system inhibition
    - Seizures
    - CNS and respiratory depression
- Indirect:
  - Choking hazard:
    - Pill size (small children)
    - Secondary to numbing of oral cavity

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Forensic Issues

- Difficult to detect grossly identify at autopsy:
  - Small
  - 1-2 capsules may be lethal
  - Rapidly cause death (minutes to hours)
  - May have been chewed
  - Pill residue/ gel aggregate probably not present in stomach
  - Unwitnessed arrhythmic deaths = negative autopsy
- Benzonatate listed in test menu ***but***:
  - Heterogenous mixture
  - Rapidly hydrolyzed (think heroin), won't detect in blood
  - Metabolite NOT easily detectable (opposite of 6-MAM)
  - Run time on column longer than most runs
  - Shows up in subsequent runs on GCMS, not as extra peak in same run

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<u>Presumed</u> Safe Because It Is Non-narcotic

- Clinicians:
  - Increased prescribing
- Scene investigators:
  - Small, resembles other things, easy to overlook
  - Not collected, listed in medication inventory
- Forensic pathologists:
  - Difficult to grossly identify
  - Assume it will show up in routine tox testing
- Forensic toxicologists:
  - Unaware that metabolite should be target for testing
  - Metabolite difficult to analyze or incidentally detect

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Challenges in Autopsy Training for Pathology Residents: a Survey of Autopsy Directors

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National Association of Medical Examiners Annual Meeting

October 16, 2023

UW Medicine LABORATORY MEDICINE & PATHOLOGY

METHODS

- Online survey regarding autopsy training during residency was distributed via COVID listserv (created by Alex Williamson)
- 29 autopsy directors/ representatives from different institutions responded

Questions based on Report and Recommendations of the Association of Pathology Chairs' Autopsy Working Group (*Acad. Path.* (2018) 5:1-10)

- Duration and structure (separate, combined) of autopsy rotation each PGY
- Number of residents and number of autopsy cases per year
- Number of attendings who sign out autopsies
- Tools used for education of residents
- Assessment of resident competency
- Tools used for continuing education of attendings
- Challenges facing autopsy education
  - Options and free text
- Effects of changing case requirements to qualify for boards
  - Options and free text

UW Medicine LABORATORY MEDICINE & PATHOLOGY

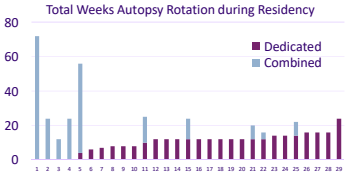
FINDINGS

- 29 autopsy directors from separate institutions participated
  - 25 academic medical centers
  - 3 academic centers + integrated forensic pathology
  - 1 community hospital

Autopsy rotation structure

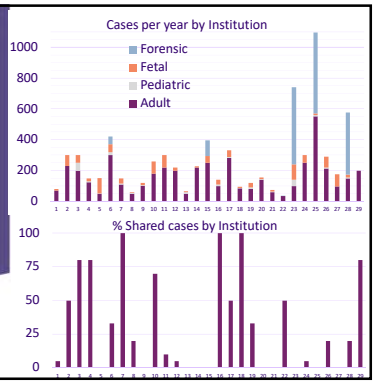
- 25 programs with dedicated autopsy rotations
  - Mostly (88% of weeks) during PGY-1/2
  - Mean and median 12 wks (range 4-24 wks)
- 7 with shared autopsy rotations
  - Mostly (80% of weeks) during PGY-1/2
  - Range 12-72 wks if no dedicated autopsy rotation
  - 4-52 wks if dedicated autopsy rotation

Total Weeks Autopsy Rotation during Residency



FINDINGS

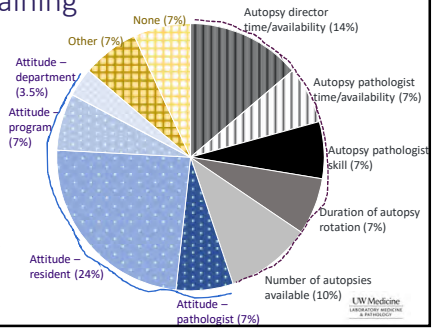
- 26 programs with dedicated forensic pathology rotations
  - Usually PGY-2/3
  - 2-8 weeks (most often 4)
- Usually 1 or 1-2 residents on autopsy service
  - 40-100% of autopsies have resident involvement (mean 94%)



Challenges in Training

What do you see as the most significant challenge in resident education in autopsy?

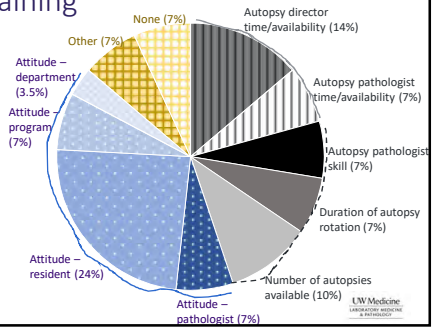
- Training skills/time (44%)
- Attitudes (41%)
- Other
  - Uneven distribution of cases (3.5%)
  - Signout carrying on after rotation ends (3.5%)



Challenges in Training

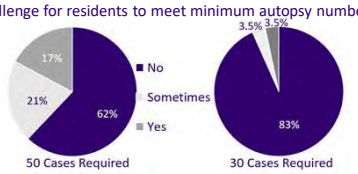
Specific comments:

- Time-consuming cases
- Autopsy director is also busy with medical school education
- Deficiencies in pre-residency education
- Resident attitude after completing the minimum required amount for boards

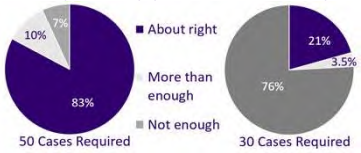


Effects of Decreasing Required Number of Autopsies

Was/is it a challenge for residents to meet minimum autopsy numbers?



Were/are required autopsy cases sufficient for competency?

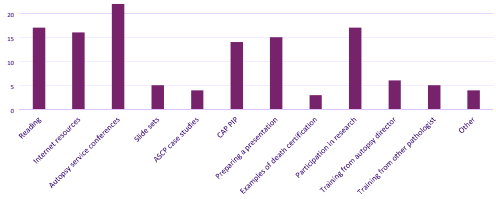


Effects of Decreasing Required Number of Autopsies

- Will it affect residency training?
  - Shortened rotations (undertaken N=3 or anticipated N=3)
  - Decreased resident interest after reaching minimum (N=1)
  - Less resident sharing of cases (N=2)
  - More autopsies without residents (increased PA/faculty role) (N=3)

UW Medicine LABORATORY MEDICINE & PATHOLOGY

How do autopsy pathologists maintain/improve their skills?



Free text:

- "There is little opportunity for skill improvement in autopsy"
- "Only the director maintains skills"
- "We maintain our skills only by our regular autopsy service- which is not much time for most of us. CAP PIP but not sure how often faculty choose to complete it."
- "per diem employment in FP"
- "Bimonthly autopsy service meeting … all residents and attendings includes … education"

Conclusions (1)

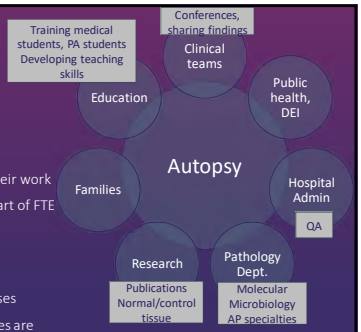
Challenges in Autopsy Training

- Negative attitudes/perceptions from residents, faculty, systems
- Autopsies are often time-consuming and autopsy directors/pathologists feel busy
- Baseline autopsy training is insufficient for autopsy skills – competition between specialties
  - Some faculty also lack opportunity for skill maintenance

Conclusions (2)

Ideas to Improve Autopsy Training

- Highlight autopsy's multiple connections
- Find passionate educators and acknowledge their work
  - Recognize autopsy work and teaching as part of FTE and promotions
  - Support interested trainees to go in-depth
    - Elective rotations, fellowship
  - Streamline simpler cases; emphasize teaching/rewarding aspects of complex cases
- Use data and storytelling to show how autopsies are valuable



Acknowledgments

- Survey takers across the USA
- Alex Williamson (Northwell Health, NY)
- Desiree Marshall (Snohomish County MEO, WA)
- Nicole Jackson (University of Washington Medical Center, WA)

PATIENT CONFIDENTIALITY POST-MORTEM:

A LEGAL AND ETHICAL ANALYSIS

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[1]University of Florida College of Medicine, Medical Student (MS3)
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1

DISCLOSURES

Brooke Ortiz (B.N.O) was supported by a grant from the **National Institutes of Health** (NIH T35HL007489). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

No additional financial interests or conflicts to disclose.

2

RESEARCH QUESTION

If a death results in an autopsy, should incidental findings with genetic implications be shared with family members?

What are the ethical and legal considerations?

3

SIGNIFICANCE

Autopsy revealed novel information[1]	**40%**
Traumatic deaths with incidental findings[2]	**14%**
Genetic studies post-mortem yielded a diagnosis[3] (when autopsy alone did not)	**25-30%**

4

RESEARCH FOCUS

This research question focuses on

- Autopsies that are not legally mandated (for example, medico-legal autopsies for a suspicious death)
  - Information in those cases may become available through the legal system
- Information that would not be on a death certificate
  - I.e. not causes of death

5

STATE LAWS DIFFER

Where a person dies can affect what information is released/available post-mortem

- Which cases proceed to autopsy is affected by state law
- Medical examiner discretion impacts whether an autopsy is performed[4]
- Accessibility of autopsy reports varies by state
  - Florida allowed public access, but with limitations
    - Death of Dale Earnhardt Sr in the Daytona 500 (2001) - restriction of access to photographs and media[5]
    - Bob Saget case (2022) - 131 people requested access to the autopsy documents and a Florida judge ruled to prevent release[6]

6

PATIENT CONFIDENTIALITY

- During **life**, protections exist for patient confidentiality.
  - HIPAA
  - Even for genetic conditions, disclosure to others is solely determined by the patient
    - Limited exception: Safer vs Pack (NJ)[7]
- **Post-mortem**, HIPAA exceptions allow for disclosure for treatment of surviving relatives and the release of information with approval by a "legally authorized executer or administrator…"[7, 8]
  - Per HIPAA, a prior expressed preference not to release information post-mortem to next of kin should be honored[9]
  - Some states have protections for HIV and AIDS[10]
- Public accessibility of autopsy reports

7

INTERESTS OF THE LIVING RELATIVES

- Screening
- Health practices
- Preparation
- The desire not to know

INTERESTS OF THE DECEASED PATIENT

- Right to privacy
- Reputation
- Desire to offer information

8

PRECEDENT

- Last will and testament
- Organ donation

9

Resolving The Ethical Problem

10

ADVANCE DIRECTIVES

- Advance directives traditionally focus on care during life, but can incorporate questions about organ donation[11]
  - This suggests that advance directives can be successfully used to govern decisions post-mortem
- Identify patient wishes/values regarding sharing incidental findings from elective autopsies
  - Guidance for family members, pathologists and other physicians
  - Ease the burden on family members after a death
  - Provide continued respect for/consideration of patient autonomy

11

PRIMARY CARE PHYSICIANS

- Establish what conditions patients may have known about
- Discuss with patients the potential for incidental findings with genetic implications post-mortem
- Explain that state laws vary, which can impact autopsy and the release of information post-mortem
- Encourage completion of advance directives

12

CONCLUSIONS

- Advance directives can offer guidance for patients, forensic pathologists and other physicians post-mortem.
- State laws impact the dissemination of healthcare information post-mortem.
- Partnership with primary care physicians proves essential.
  - Increase completion rates for advance directives
  - Access to EMR to identify conditions diagnosed ante-mortem and patient choices regarding disclosure
  - Communication with families

How to operationalize (a health policy issue)

13

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And now, for the rest of the story: The Sudden and Unexpected Death Surveillance System

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Erik D. Christensen, MD
Utah Office of the Medical Examiner

Utah Department of Health & Human Services

1

Death investigation is the foundation of public health.

2

In 2017, the Utah legislature created the position of "psychological autopsy examiner."

Goal: Provide near-real time surveillance of suicide mortality in Utah and close gaps in knowledge about people who die by suicide—and later, other types of mortality—to improve public policy and prevention.

Following a promising start with suicide deaths, the legislature expanded the program to include drug related deaths in 2020, creating the "drug overdose research coordinator position."

See the legislation by scanning this QR Code:

3

Two approaches

- Research: The Utah Youth Suicide Research Project (UYSRP)
- SUDSS: Short form interviews with next-of-kin

4

The Sudden and Unexpected Death Surveillance System

- Attempt to interview at least one next-of-kin for every Utahn who dies by suicide and unintentional drug related deaths.
- Within 4 to 8 months of death.
- To fill in gaps in knowledge about the circumstances leading up to the death.
- And to provide bereavement (postvention) support to families and social networks.

5

Improved demographics

We improve upon demographic information gathered by funeral directors, including:

- Relationships and children
- Employment and financial hardship
- Housing status
- Religion
- Sexual orientation and gender identity
- Service member and veteran status

6

Improved circumstantial information

We obtain better information about the *why*:

- Connectedness and attachment
- Traumatic experiences
- Criminal history
- Medical history
  - Mental health history
    - Diagnosed and undiagnosed symptomology
- Prescription medication and engagement in therapy
- Alcohol, tobacco, marijuana, and drug use history
- Inventory of suicidal risk factors and warning signs

7

Postvention is prevention

- Interventions that break intergenerational maladaptive coping strategies.
- Interventions for specific groups of people and problems.
- Interventions for people experiencing a crisis.

8

Findings from 950 SUDSS-Suicide interviews

9

39.4% were unemployed at the time of their death.

Half of those unemployed were not looking for work.

10

Nearly 70% were a member of a religious congregation at some point in their life.

Only 44% considered themselves a member of a religious congregation at the time of death.

Findings suggest that those who die by suicide may be likely to experience a *faith transition* in their lifetime.

11

12.4% identified as a sexual orientation other than straight/ heterosexual.

2.1% identified as transgender or gender non-binary.

12

46.8% complained of being in physical pain in the 30 days prior to death.

13

57.4% had a known mental health diagnosis at the time of death.

14

57% reported the individual appeared more sad or gloomy in the 30 days prior to death.

41% were sleeping more or less than usual in the 30 days prior to death.

15

37.5% reported at least one prior non-fatal suicide attempt.

Nearly 1 in 5 did not obtain treatment following their prior, non-fatal attempt.

16

35.6% reported being especially worried about COVID-19.

n=655

17

12.3% of suicide decedents experienced a period of homelessness in their lifetime.

35.4% of individuals who died from an unintentional drug overdose experienced a period of homelessness in their lifetime.

18


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PREDATORY JOURNALS AND A CAUTION TO EARLY CAREER RESEARCHERS AND ACADEMICS

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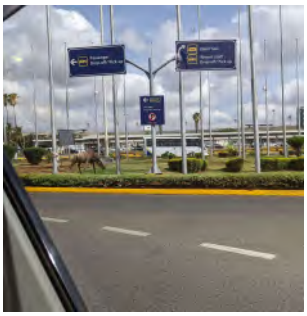
Instagram: Pathologiste.judiciare

1

"Do you know the way to San Jose? Forensic Pathology – Prospering after Pandemic"



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DECLARATION

- No financial interests to declare
- No affiliation with any lists/databases mentioned in this presentation
- Have not been paid or induced by anybody to write anything, anywhere, by any means

3

OBJECTIVES

- Know the dangers of predatory journals
- Be alert to the features that are suggestive of a predatory journal
- Know mechanisms and select checklists that can be employed to avoid submitting articles to a predatory publisher

4

BACKGROUND

Academic fraud and sloppy peer reviews predate Open Access Publication (OAP)

Digital media and the internet have contributed to the development of OAP

OAPs have been both a boon as well as a vehicle for academic fraud.

Why is the latter important? What relevance is it to early career researchers in forensic pathology?

PNGEgg. https://www.pngegg.com/en/search?q=open+Access

5

ABOUT OPEN ACCESS

- Works by charging authors a fee (runs business, maintains operation and infrastructure)
- As opposed to “subscription” model where readers pay
- Predatory publishers exploit this model to deliver a subpar product

6

Jeffery Beall

Jeffrey Beall. (2023, August 19). In *Wikipedia*. https://en.wikipedia.org/wiki/Jeffrey_Beall

"Predatory publishers" was coined by Jeffery Beall (2012)

Used to describe those journals whose purpose is to publish for profit without regard to the quality of the article or the thoroughness of the **peer review**

His list of questionable journals was triggered by requests from journals of dubious quality to serve on their boards

In a 5-year period the number of journals on his list had grown by more than 500%

Faced accusations of bias, imprecision, defamation

7

Beall characterizes predatory publishing. They are presented in Table 3.

Table 3. Major themes that characterize predatory publishing in Beall's writings according to the codes used in quantitative publication analysis of this study

Code	Example of theme in Beall's writings
New phenomenon	Beall perceives predatory journals as something new that emerged from the OA movement and have since then proliferated very quickly (Beall, 2018, p. 285).
Intent to deceive	In Beall's writings, it is not a lack of skill in proper publishing that characterizes predatory publishers but the fact that those publishers are "established and designed to deceive" (Beall, 2012b) as well as that they act only "for their own profit" (Beall, 2016b, p. 1511).
Poor peer review	Beall argues that, even when predatory publishers conduct peer reviews, they are poor quality, and, in the end, they are "accepting any and all submissions just for the money"(Beall, 2013a, p. 591)
Author charges	For Beall, charging authors is a distinctive feature of predatory publishing that "abuse[s] the author pays model" (Beall, 2013d, p. 11)
Combining predatory publishing with OA	Beall defines predatory journals as OA and writes: "By definition, all predatory journals follow the gold open-access model" (Beall, 2013c, p. 10)

Franciszek Krawczyk, Emanuel Kulczycki, How is open access accused of being predatory? The impact of Beall's lists of predatory journals on academic publishing, The Journal of Academic Librarianship, Volume 47, Issue 2, 2021

8

BEALL'S LIST
OF POTENTIAL PREDATORY JOURNALS AND PUBLISHERS

PUBLISHERS | STANDALONE JOURNALS | VANITY PRESS | CONTACT | OTHER

Search for publishers (name or URL)

Potential predatory scholarly open-access publishers

Instructions: first, find the journal's publisher – it is usually written at the bottom of the journal's webpage or in the "About" section. Then simply enter the publisher's name or its URL in the search box above. If the journal does not have a publisher use the Standalone Journals list.

All journals published by a predatory publisher are potentially predatory unless stated otherwise.

Original list — GO TO UPDATE

This is an archived version of the Beall's list – a list of potential predatory publishers created by a librarian Jeffrey Beall. We will only update links and add notes to this list.

- 1086 Email Press
- 2425 Publishers
- The 5th Publisher
- ABC Journals

Useful pages

List of journals falsely claiming to be indexed by DOAJ

DOAJ: Journals added and removed

Nonrecommended medical periodicals

Retraction Watch

Flaky Academic Journals Blog

List of scholarly publishing stings

Conferences

9

WHY IS PEER REVIEW IMPORTANT?

- **Has been around for centuries** – model is essentially the same
- Meant to disentangle scientific conclusions from opinion and speculation
- **It is an imperfect process** meant to check whether an article submitted for publication valid, original and adheres to ethical standards in the conduct of the research
- Most agree that **despite its limitations** it is important to developing a body of knowledge which others can build on
- **Good feedback (on peer review) helps** in the training and development of early career researchers

10

How it all starts

Inexperienced researchers are at high risk of submitting a paper upon receipt of an unsolicited email.

"Dear Obenson Ken
Greetings for the day. **Hope this mail finds you well.**

We are glad to inform you that submissions for the forthcoming edition of the **Journal of Forensic Science & Criminology [2348-9804]** are currently being accepted. You can contribute research articles, clinical trials, case studies, and review papers, as well as work that is highly relevant to the field of **Forensic Science** and **Criminology**."

11

Dear Ken Obenson,

Consider this email as a friendly reminder.

We understand your busy schedule and other commitments. Hence, this is a follow-up email to submit your manuscript to our journal. It will be a great honor to have your contribution to the Journal with your eminent work.

Greetings from the **"Obstetrics and Gynecology: Open access".**

It would be an honor for our journal if you could submit your write-up manuscripts for the upcoming issue of our journal.

Journal accepts all types of manuscripts such as Research/Review/Mini-review/Opinion articles/Commentary/Short communication/Case Reports.

Our review process runs quickly, your manuscript will be published within **12 days** from the date of submission. All submissions would go through a rapid double-blind peer review procedure.

All the accepted articles will be registered with a unique (DOI) number- Crossref.

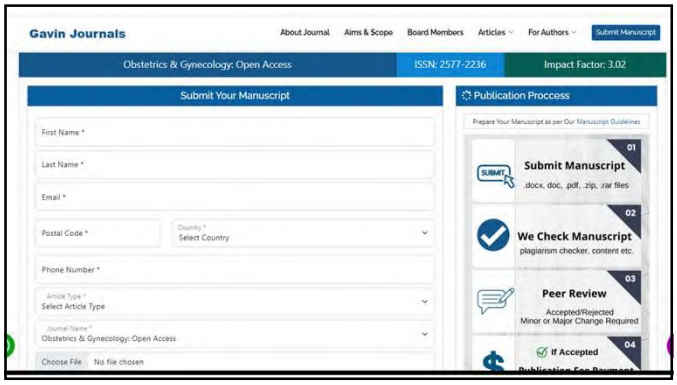
Kindly submit your full-length manuscript as an attachment to this email.

Note: Quick Submissions are provided a special discount on actual publication charges.

Awaiting your response and submission.

Kind Regards,
Jason

12



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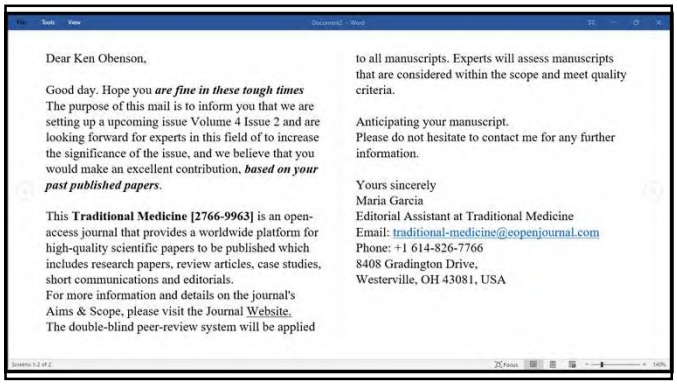

Dear Ken Obenson,

Good day. Hope you ***are fine in these tough times***
The purpose of this mail is to inform you that we are setting up a upcoming issue Volume 4 Issue 2 and are looking forward for experts in this field of to increase the significance of the issue, and we believe that you would make an excellent contribution, ***based on your past published papers***.

This **Traditional Medicine [2766-9963]** is an open-access journal that provides a worldwide platform for high-quality scientific papers to be published which includes research papers, review articles, case studies, short communications and editorials.
For more information and details on the journal's Aims & Scope, please visit the Journal Website.
The double-blind peer-review system will be applied to all manuscripts. Experts will assess manuscripts that are considered within the scope and meet quality criteria.

Anticipating your manuscript.
Please do not hesitate to contact me for any further information.

Yours sincerely
Maria Garcia
Editorial Assistant at Traditional Medicine
Email: traditional-medicine@eopenjournal.com
Phone: +1 614-826-7766
8408 Gradington Drive,
Westerville, OH 43081, USA

14

Red Flags

Red flag warning. (2023, August 7). In *Wikipedia*. https://en.wikipedia.org/wiki/Red_flag_warning

- Spam emails inviting submission of papers/editorial board appointments/topics unrelated to their work/flattering greetings
- Spelling or grammatical errors
- Misleading or unrecognised impact factors
- Submission sent by email rather than through a manuscript management system (they are getting savvy to this!!)
- Retention of copy right even though the access is supposed to be open

15

- Low article processing charges
- Fast turnaround time
- Guaranteed acceptance
- Fees may be hidden
- Papers may not be indexed in a reputable database
- Article may not be curated and so could disappear just as quickly as they were published
- Retraction is rather difficult

Note*
Google Scholar is an **internet search engine only.** It is not (yet) an indexing database of pre-selected, (reputable) journals

16

Recognized

- Citescore
- Eigenfactor
- Source Normalized Impact Factor (SNIP)

JOURNAL IMPACT FACTOR

The Journal Impact Factor is a measure of the frequency with which the "average article" in a journal has been cited in the previous two years. (1)

Calculated annually from the Journal Citation Reports (JCR) database since 1975
(How? By dividing the number of citations in the JCR year by the total number of articles published in the two previous years).

Sources
Research Guides University of Calgary. Sept 2023
https://libguides.ucalgary.ca/publishing/impact_factor

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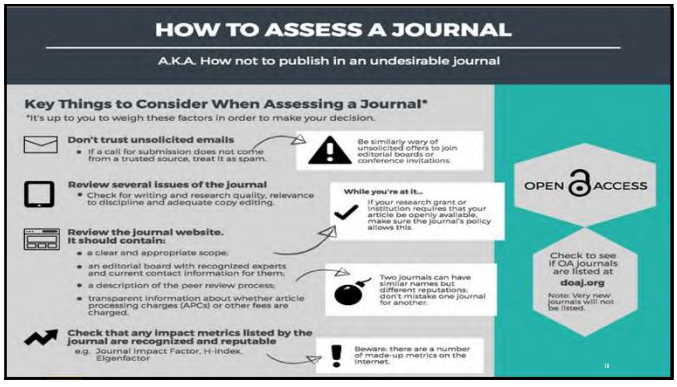

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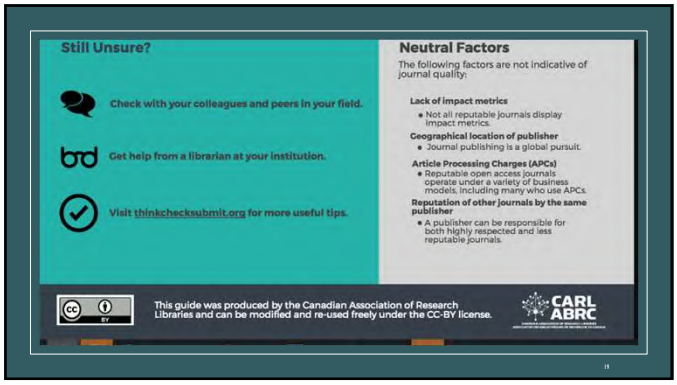
Still Unsure?
Check with your colleagues and peers in your field.
Get help from a librarian at your institution.
Visit thinkchecksubmit.org for more useful tips.
Neutral Factors
The following factors are not indicative of journal quality:
Lack of impact metrics
Not all reputable journals display impact metrics.
Geographical location of publisher
Journal publishing is a global pursuit.
Article Processing Charges (APCs)
Reputable open access journals operate under a variety of business models, including many who use APCs.
Reputation of other journals by the same publisher
A publisher can be responsible for both highly respected and less reputable journals.
This guide was produced by the Canadian Association of Research Libraries and can be modified and re-used freely under the CC-BY license.
CARL ABRC

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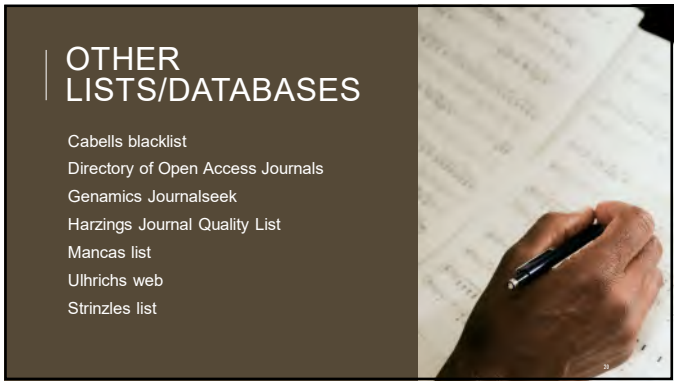
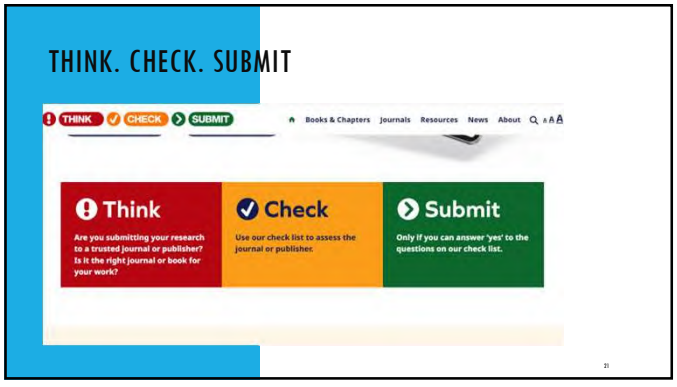

OTHER LISTS/DATABASES
Cabells blacklist
Directory of Open Access Journals
Genamics Journalseek
Harzings Journal Quality List
Mancas list
Ulhrichs web
Strinzles list

20


THINK. CHECK. SUBMIT
THINK
CHECK
SUBMIT
Books & Chapters
Journals
Resources
News
About
Think
Are you submitting your research to a trusted journal or publisher? Is it the right journal or book for your work?
Check
Use our check list to assess the journal or publisher.
Submit
Only if you can answer 'yes' to the questions on our check list.

21

NOT ALL PREDATORY JOURNALS MEET PREDATORY CRITERIA

NOT ALL PREDATORY JOURNALS MEET EACH CRITERION AT THE SAME LEVEL

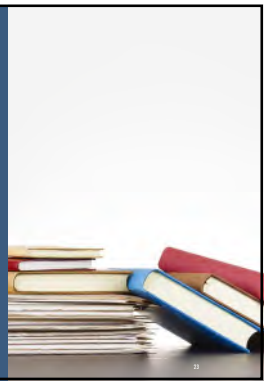
22

OPEN ACCESS PUBLISHING

Is not synonymous with predatory publishing

Accusations that a journal is predatory may be founded on racism or bias

Measures of quality (JIF) are biased towards established journals and publishers with a well-known cachet.



23

Review > Med Arch. 2020 Aug;74(4):318-322. doi: 10.5455/medarh.2020.74.318-322.

Predatory Open Access Journals are Indexed in Reputable Databases: a Revisiting Issue or an Unsolved Problem

Nguyen Minh Duc [1 2 3], Dang Vinh Hiep [4], Pham Minh Thong [5], Lejla Zunic [6], Muharem Zildzic [7], Doncho Donev [8], Slobodan M Jankovic [9], Izet Hozo [10], Izet Masic [11]

Affiliations + expand

PMID: 33041454 PMCID: PMC7520066 DOI: 10.5455/medarh.2020.74.318-322

Free PMC article

INDEXING ON REPUTABLE DATABASES SUCH AS

PubMed, PubMed Central, MEDLINE, SCOPUS, and Web of Science

IS NOT A GUARANTEE OF NON-PREDATORY BEHAVIOR

24

Early career researchers should be warned that:

Editorial > Injury. 2022 Nov;53(11):3567-3568. doi: 10.1016/j.injury.2022.10.002.

Academic publishing and predatory journals - a tension between dissemination of scientific knowledge and the academic performance pressure

Markus Rupp [1], Nike Walter [1], Peter V Giannoudis [2], Volker Alt [3]

Affiliations + expand

PMID: 36266016 DOI: 10.1016/j.injury.2022.10.002

Academic promotion and tenure committees are familiar with the problem of predatory journals ("publish or perish")

- Many such articles never get cited (5 year follow up)
- Content will be cited and repeated in other journals, including legitimate titles
- Patient safety may be threatened if clinicians apply findings to patient care
- Gives credence to nonsensical/untested/unproven ideas or theories

25

25

Do you want to be "court roasted" by well prepared defense counsel (because you published an article in a predatory/undesirable journal)?

Photo credit to Twitter account **Man's NOT Barry Roux** @AdvoBarryRoux

26

26

THANK YOU FOR YOUR ATTENTION

27

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National Institute of Justice's (NIJ) Initiatives to Support the MDI Community

Danielle McLeod-Henning
Physical Scientist
Office of Investigative and Forensic Sciences
National Institute of Justice

NIJ

NAME 2023 Annual Meeting
October 2023
San Jose, CA

1

DOJ Disclaimer

- Any opinions or points of view expressed are those of the author(s) and do not necessarily reflect the official position or policies of the U.S. Department of Justice.
- Names of commercial manufacturers or products are incidental only, and inclusion does not imply endorsement by the author(s) or the U.S. Department of Justice.
- Unless otherwise noted, all figures, diagrams, media and other materials used in this presentation are created by the respective author(s) and contributor(s) of the presentation and research.

NIJ

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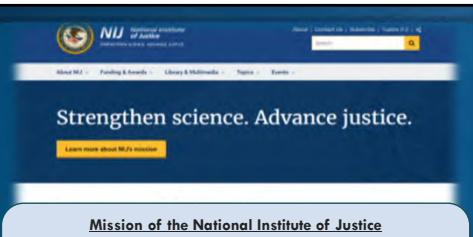

Mission of the National Institute of Justice

NIJ – the research, development, and evaluation agency of the U.S. Department of Justice — is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to reduce crime and promote justice, particularly at the state and local levels.

NIJ

https://nij.ojp.gov/

3

NIJ's Office of Investigative and Forensic Sciences

- **Lead federal agency for facilitating forensic science research and development through academic, federal, state, and local entities**
- **MISSION: Strengthen the quality and practice of forensic science through research and development, testing and evaluation, technology, and information exchange.**

NIJ https://nij.ojp.gov/about-nij/about-nijs-office-investigative-and-forensic-sciences

4

NIJ's Forensic Science Strategic Research Plan

I. Advance Applied Research and Development in Forensic Science
II. Support Foundational Research in Forensic Science
III. Maximize the Impact of Forensic Science R&D
IV. Cultivate a Diverse, Highly Skilled Forensic Science Workforce
V. Coordinate across the Community of Practice

NIJ https://nij.ojp.gov/topics/articles/forensic-sciences-strategic-research-plan-2022-2026

5

Funding Opportunities

NIJ

6

R&D in Forensic Science for Criminal Justice Purposes

Purpose: Support foundational or applied research and development in forensic science for criminal justice purposes.

Increase the body of knowledge to guide and inform forensic science policy and practice, or **Lead to the production** of useful material(s), device(s), system(s), or method(s) that have the potential for forensic application.

NIJ https://nij.ojp.gov/funding/opportunities/o-nij-2023-171606

7

R&E in Publicly Funded Forensic Laboratories

Purpose: Identification of the most efficient, accurate, reliable, and cost-effective methods to examine and interpret physical evidence for criminal justice purposes.

Assessing Existing Laboratory Protocols Improve the understanding of scientific rationale underpinning existing laboratory processes. **Evaluating Emerging Methods** Assess the value of emerging laboratory processes.

MUST be or partner with a **publicly funded, accredited forensic lab**

NIJ https://nij.ojp.gov/funding/opportunities/o-nij-2023-171560

8

Graduate Research Fellowship

Goal: increase the pool of researchers engaged in addressing the challenges of criminal and juvenile justice.

Fellowship includes annually:

- **$40,500** student stipend
- **$12,000** cost of education allowance
- **$3,000** research expenses

Up to 3 years of support possible

Students in **all fields of science and engineering** are welcome, if their work is relevant to criminal or juvenile justice.

NIJ https://nij.ojp.gov/funding/opportunities/o-nij-2023-171521

9

How to Find a Funding Opportunity

1. Go to: https://nij.ojp.gov/

2. Select "FUNDING & AWARDS" & Click on "CURRENT FUNDING" from Dropdown

NIJ https://nij.ojp.gov/funding/current

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NIJ Solicitation Notifications

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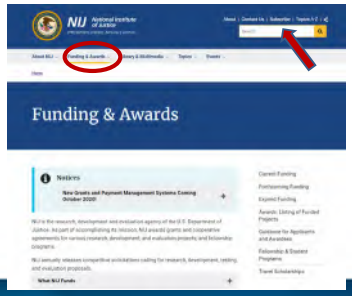
Find us on: facebook @OJPNIJ



NIJ https://nij.ojp.gov/funding

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R&D Investments

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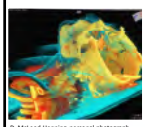
Postmortem Imaging Technologies

Utility of Postmortem X-ray Computed Tomography (CT) in Supplanting or Supplementing Medicolegal Autopsies
PI: Kurt Nolte, University of New Mexico

Investigation of Post-Mortem Magnetic Resonance Imaging for the Detection of Intraneural Hemorrhage
PI: Gary Hatch, University of New Mexico

https://nmdid.unm.edu/



D. McLeod-Henning, personal photograph.

- **Investigation of the Impact of Body Temperature and Post-Mortem Interval on Magnetic Resonance Imaging (MRI) of Unfixed Tissue**
- **Evaluation of the Routine Use of CT Scanning to Supplant or Supplement Autopsy in a High-Volume Medical Examiner's Office**
- **Improving and Evaluating Postmortem CT and MRI in the Investigation of Fatalities**

PI: Natalie Adolphi, University of New Mexico

Facilitating Forensic Research in Multiple Fields Using a Unique Computed Tomography Dataset
PI: Heather Edgar, University of New Mexico

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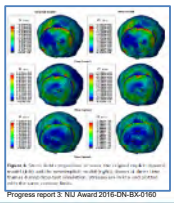
Assessing Pediatric Head Trauma

- **Skull fracture patterns from head impact in infants**
- **Forensic tool to identify fall characteristics in infant skull fracture**

PI: Brittany Coats, University of Utah



Progress report 3: NIJ Award 2016-DN-BX-0160

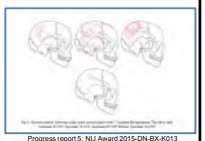
Understanding the Pathology of Homicidal Pediatric Blunt Neurotrauma through Correlation of Advanced Magnetic Resonance Images with Histopathology
PI: Heather Jarrell, University of New Mexico

- **Development of a Computer Simulation Model to Describe Potential Bruising Patterns Associated with Common Childhood Falls**
- **Biomechanical Characterization of Video Recorded Short Distance Falls in Children**
- **Development of a Probability Model to Predict Head Injury Risk in Pediatric Falls**

PI: Gina Bertocci, University of Louisville Research Foundation, Inc.

- **Pediatric Fracture Printing: Creating a Science of Statistical Fracture Signature Analysis**
- **A Forensic Pathology Tool to Predict Pediatric Skull Fracture Patterns**

PI: Todd Fenton, Michigan State University



Progress report 5: NIJ Award 2015-DN-BX-K013

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14

Sudden Unexplained Death

- **Investigating Unexplained Deaths through Molecular Autopsies**
- **Solving Cases of Sudden Unexpected Natural Death in the Young through Comprehensive Postmortem Genetic Testing**

PI: Yingying Tang - New York City Office of the Chief Medical Examiner

Potential Postmortem Microbial Biomarkers of Infant Death Investigation
PI: Jennifer Pechal – Michigan State University

Identification of Clostridium perfringens enterotoxin as a novel candidate trigger for Sudden Infant Death Syndrome
PI: Vincent Fischetti - The Rockefeller University

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15

MDI Initiatives

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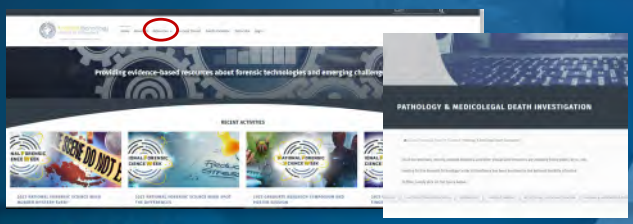
16

NIJ'S FORENSIC TECHNOLOGY CENTER OF EXCELLENCE (FTCOE) at RTI



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https://forensiccoe.org/

17

FTCOE Tech Transition Activities, Documents, Podcasts, Webinars

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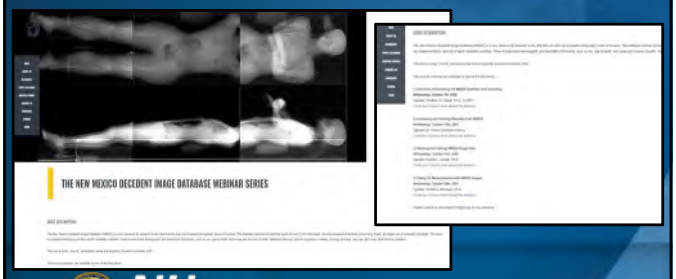
18

NIJ's FTCOE Webinar Series on PMCT

NIJ https://forensiccoe.org/advanced_imaging_technologies_death_investigation/

19

NIJ's FTCOE Webinar Series on NMDID



NIJ https://forensiccoe.org/webinar/nmdid-webinar-series/

20

NIJ/FTCOE MDI Data Exchange Working Group

- To document and provide recommendations to enhance data collection and data exchange in death investigations
- In collaboration with, and supported by, CDC's National Center for Health Statistics

NIJ https://forensiccoe.org/working-group-data-exchange-mdi/

21

NIJ National Centers on Forensic Sciences

- Provide medicolegal learning opportunities for medical students to train as deputy medical examiners/coroners in underserved rural areas;
- Provide forensic science and legal training to district attorneys, judges, and law enforcement; and
- Develop opportunities as appropriate amongst the designated partners to benefit current and future practitioners in the field

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22

A national centralized repository and resource center for missing, unidentified, and unclaimed person cases across the United States.

NIJ https://namus.nij.ojp.gov/

23

NamUs Forensic Services

- DNA analysis
- Forensic anthropology
- Forensic odontology
- Fingerprint examination

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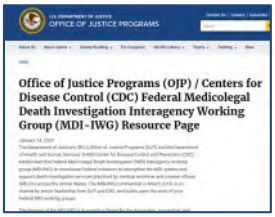
OJP/CDC Federal MDI Interagency Working Group (MDI-IWG)

- Coordinate Federal initiatives to strengthen the MDI system
- Support death investigation services practiced by ME/C offices across the United States
- Identify short- and long- term goals to develop and implement programmatic activities that support the MDI system



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https://www.ojp.gov/resources/ojp-hhs-mdi-wg

25

Thank you! Questions?

danielle.mcleod-henning@usdoj.gov

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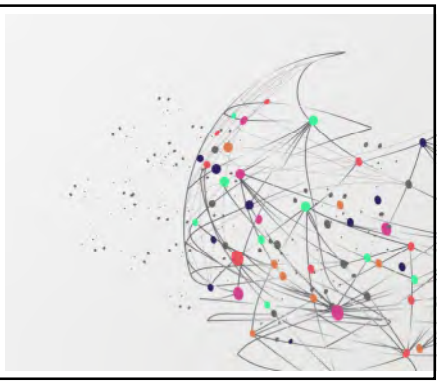
26

Legislative Encroachments:

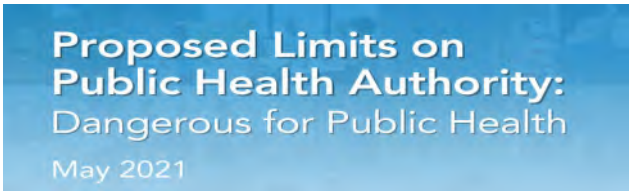
Identifying and Defeating Emerging Threats

M.J. Menendez, J.D.
NAME Workforce Subcommittee
Center Forensic Science Research Ed.
MJ.Menendez@CFSRE.org



1

Why Are We Talking About Legislative Tracking in Your Scientific Session?



Publication from The Network for Public Health law
and the National Association of County and City Health Officials May 2021

2

Covid: The Era of Legislating Public Health

- Montana: Law enacted prohibiting local board of health from issuing emergency quarantine orders;
- Arizona: Law enacted blocking state hospitals and universities from requiring vaccinations, except in K-12 settings, with potential criminal penalties for violations;
- Kansas: Law enacted removing the Governor's ability to close businesses during public health emergencies;
- Ohio: Law enacted allowing the "Legislature alone" to rescind any order or action by the state health department or director of health to control the spread of contagious disease.
  - Vetoed by Governor and overridden by Legislature—law in place.

3

4

Texas: SB 645 and companion HB 6,
signed into law 3.15.2023, effective 9.1.2023

"The medical certification on a death certificate must include the term 'Fentanyl Poisoning' if:

A toxicology examination reveals a controlled substance in Penalty Group 1-B [Fentanyl and analogues] present in the body of the decedent

In an amount or concentration that is considered be "lethal" by generally accepted scientific standards; and

The results of an autopsy performed on the decedent are consistent with an opioid overdose as the cause of death."

5

Indiana: House Bill 1286,
signed into law 4.20.2023, effective 7.1.2023

- If a coroner reasonably suspects the cause of death to be accidental or intentional overdose of an opioid,
- Or if the decedent was administered reversal drug prior to death and was unresponsive to drug,
- The coroner shall test blood, vitreous, or urine to determine whether the bodily fluid contained any amount, including a trace amount, of xylazine at the time of the person's death.

6

Xylazine and Scheduling: Science or Law?

- Not federally scheduled; Permanent administrative scheduling would require Eight Factor Analysis performed by HHS prior to DEA acting;
- Congressional scheduling:
  - HALT Act (HR 467), Combatting Xylazine Act (HR1839), et.al.
- Florida: Schedule I
- Ohio, New Jersey, Delaware, Pennsylvania: Schedule III
- West Virginia: Schedule IV
- Pending legislation in New York, Louisiana, Illinois, and Rhode Island

7

Oregon: Senate Bill 953,

stalled in Judiciary Committee in April 2023

- Amends definition "county medical examiner" to means physician, physician assistant or nurse practitioner appointed by the Chief Medical Examiner to investigate and certify deaths within a county, including the Deputy Medical Examiner;
- The Chief Medical Examiner shall "designate those pathologists, physician assistants and nurse practitioners authorized to perform autopsies under ORS 146.117(2) and define their individual scopes of practice within the OCME";
- Approves physician assistant and the nurse practitioners for ME duties;
- The ME will provide training and supervision for physician assistants and nurse practitioners in performance of autopsies, death investigation and death certifications.

8

California SB 67,

Presented to Governor for signature 9.2.2023

- "A coroner (C) or medical examiner (ME) who evaluates an individual who died, in the C's or ME's expert opinion, as a result of an overdose as a contributing factor, shall report the incident to the Overdose Detection Mapping Application (OD Maps) managed by the Washington / Baltimore High Intensity Drug Trafficking Area program (HIDTA)."
- "Overdose information reported to OD Maps by a coroner or medical examiner or shared with OD Maps by the Emergency Medical Services Authority (EMS) shall not be used for a criminal investigation or prosecution."
- A person who makes such a report in good faith has civil and criminal immunity.
- HIDTAs are primarily law enforcement agencies, although OD maps was designed to serve public health EMS and public safety.

9

New York A04397,
introduced 2.14.2023

- Establishes a New York State "OD Mapping" platform
- When C or ME determines that the death of a person was caused by an overdose, the C or ME shall report information to NY OD Maps no later than 24 hours to extent information in known, to include:
  - Date and time of overdose incident;
  - Location of overdose incident;
  - Whether naloxone was administered, with number of doses and delivery mode;
  - Whether the confirmed or expected overdose incident was fatal or nonfatal;
  - The gender and approximate age of the overdose event;
  - The suspected substance involved;
    - Civil and criminal immunity provisions apply

10

Washington SB 5523,
signed by Governor May 11. 2023 –[We can watch for "they good" too!]

- "FP's are medically trained doctors who perform autopsies. For the last decade, there has been a persistent shortage of FPs both locally and nationally, and this problem has only grown worse. It is the intent of the legislature to incentivize people to enter the professional by alleviating the student loan burden for medically trained FPs."
- "The forensic pathology loan repayment program is established for board-certified FPs providing services for counties in identified shortage areas."
  - "Identified shortage areas": Identified by WA State Forensic Inv. Council
    - FPs in short supply due to geographic maldistribution
    - Vacancies exist that compromise death investigations

11

We are Forensic Pathologists, Medical Examiners, Coroners, MDI—What Can We Do?

1. **Watch legislative movement in your state or states of practice (Locums) by designating a responsible party to monitor bills introduced and legislation moving;**
   - **nonmedical administrative personnel can easily achieve these taskings;**
2. **Communicate movement out to professional associations; in NAME communicate introduction of any bill you want watched to Strategic Planning and Workforce;**
3. **Be the conduit to your state authorities for national leaders to join forces with the true experts in your state—AND THAT IS YOU!**
4. **Know NAME is watching all 50 states and will be reporting back to you, but there is NO SUBSTITUTE for your eyes on the ground.**

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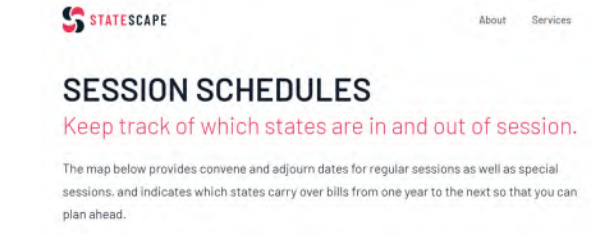
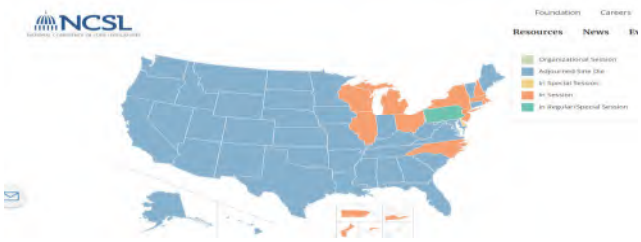
1. Know when your Legislature is in Session



StateScape has a free map, but National Conference of State Legislatures also has user-friendly map…next slide!

13

Know When Your Legislature Meets



National Conference of State Legislatures

14

Know When Your Legislature Meets

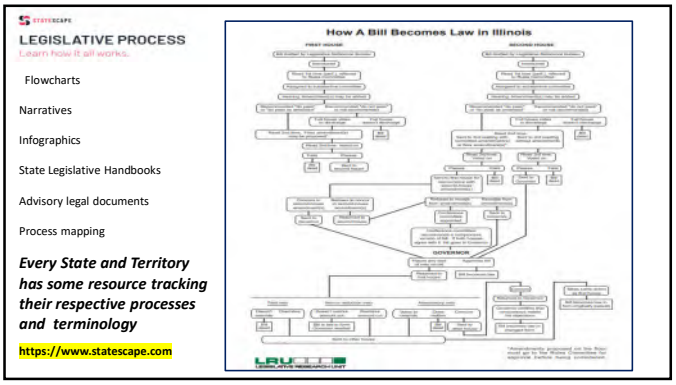
National Conference of State Legislatures

15

Know How Your Legislature Works

https://www.statescape.com

16



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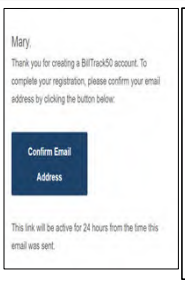
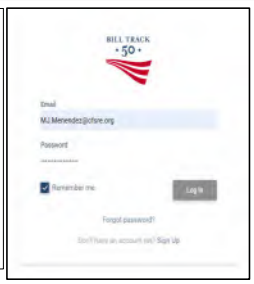
Subscription Services Exist, but we can do this without another subscription…





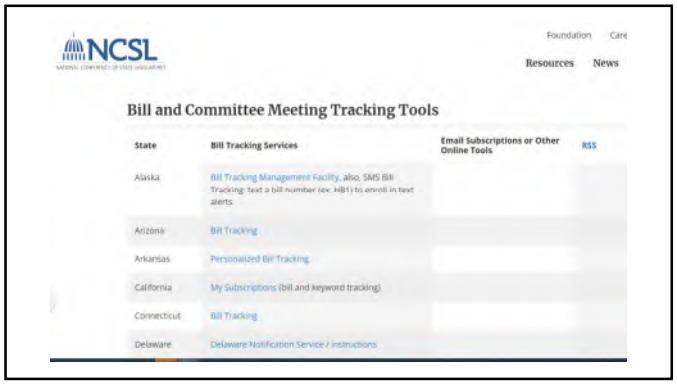
LexisNexis

Westlaw

18


NCSL
NATIONAL CONFERENCE OF STATE LEGISLATURES
Updated September 26, 2022
Bill Tracking and Subscription Services on Legislative Websites
Many state legislatures offer online tools that make it easy for citizens to track bills and keep up with legislative proceedings in their state.
About State Legislatures
Table

19


NCSL
Foundation
Care
Resources
News
Bill and Committee Meeting Tracking Tools
State
Bill Tracking Services
Email Subscriptions or Other Online Tools
RSS
Alaska
Bill Tracking Management Facility, also, SMS Bill Tracking: text a bill number (ex: HB1) to enroll in text alerts
Arizona
Bill Tracking
Arkansas
Personalized Bill Tracking
California
My Subscriptions (bill and keyword tracking)
Connecticut
Bill Tracking
Delaware
Delaware Notification Service // instructions

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NCSL
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Foundation
Care
Resources
News
State
Bill Tracking Services
Email Subscriptions or Other Online Tools
RSS
Tennessee
My Bills
Senate Weekly Calendars, House Weekly Calendars
Texas
MyTLO
RSS
Utah
Bill Tracking
Virginia
Lobbyist-in-a-Box (track up to five bills)
E-Mail Notifications
Washington
Track Bills
Legislative Lists
RSS
West Virginia
Personalized Bill Tracking
RSS
Wisconsin
Notify: Legislative Notification System
Notify: Legislative Notification System

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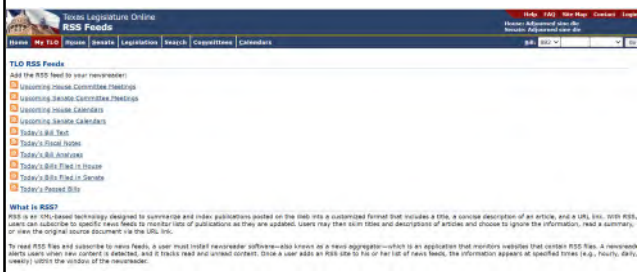
RSS Link from NCSL—Free and Complete Access



22

SHOUT OUT TO WORKFORCE WARRIORS!!

- ***Abstract and magnification of issue is due to the great Workforce Subcommittee members who brought this to the attention of NAME, and took the time to say, "Yes! Abstract!! Really important!!"***
- NAME Workforce Subcommittee, NAME Strategic Planning Committee, and many other very active NAME committees are looking for ways to roll up sleeves and dig in! Please join up!
- You make the tip or the outreach on pending threats from legislative encroachment or non-scientific activism, and I PROMISE you the information will move forward to leadership, or I buy you two libations next event…

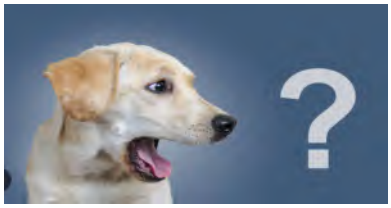
23

Conclusion: Let's Head Off These Very Real Threats—

COMMUNICATE EARLY, OFTEN, AND MAKE THE NEXT CALL WHEN CALLED UPON

24

MJ - 215.433.4649
MJ.Menendez@CFSRE.org



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The Medical Examiner's Office as an Independent 501(c)3 Nonprofit Business:

*Trials, Tribulations and the Journey to Success**

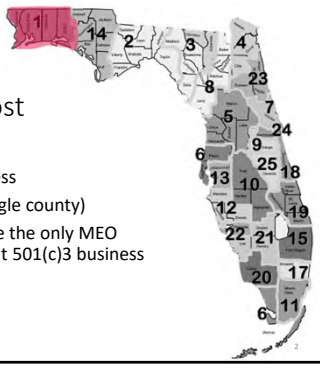
Deanna A. Oleske, M.D. – Chief MEO District 1
CAPT Dan Schebler USN (Ret) – District 1 Director of Operations

1

1

Florida, First and Foremost

- 25 Districts covered by 22 MEOs
- 55% are private for-profit business
- 40% are county run (multi or single county)
- District 1 MEO is first and to date the only MEO run as an independent non-profit 501(c)3 business



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DOMES,Inc.

The Origin Story

3

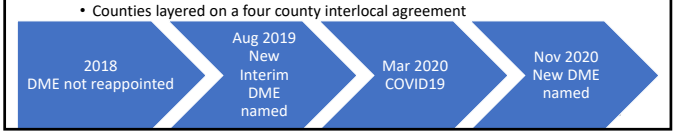
Why a non-profit in the panhandle of FL

- Had always been a private business (since 1972) with counties providing funding monthly as a reimbursable
- Budget underfunded year after year – no one advocated for the MEO
- No capital investment requests, facility issues ignored
- August 2019 - Departure of the District ME = Departure of the business entity
- 17 employees with potentially nowhere to work

4

Why a non-profit in the panhandle of FL

- New Interim in August 2019 not interested in being a private small business owner
- No county was willing to bring the ME services "in-house"
- Operating model had to change to continue to deliver the services
- Santa Rosa County created a non-profit business entity
  - District One Medical Examiner Support, Inc. (DOMES)
  - Filed for 501(c)3 designation, Articles of Incorporation, Bylaws
  - Counties layered on a four county interlocal agreement



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Officers and Board – DOMES, Inc.

- Officers
  - President – Okaloosa Assistant County Administrator
  - Treasurer – Director of Finance Walton County
  - Secretary – Santa Rosa Assistant County Administrator
- 4 Board members
  - Representative from each of the four counties
  - No tie breaking vote
- Chief ME is the CEO of the business
  - Cannot open accounts / credit cards
  - No vote on their own board
  - Has limited discretionary spending power
  - Leads the procurement of equipment and contract purchases
  - Enters contract agreements

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Why I signed up for this insane idea

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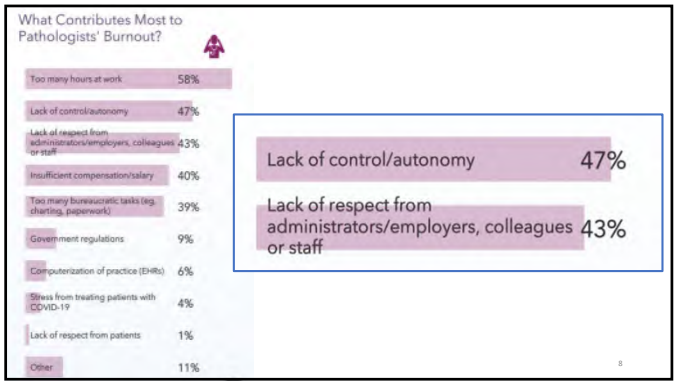

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Why I signed up for this

- Autonomy
- PSLF
- Pioneering a way of doing something different
- Figuring it out
- Making things better

9

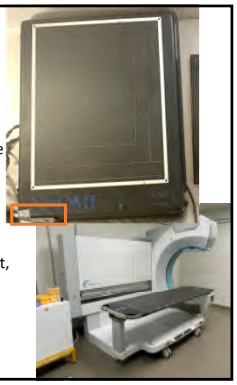
9

Non-profit > County

- Transparency with oversight
- Autonomy
- Less red tape
  - Salaries
  - Titles
  - Hiring / Firing
  - Purchasing
  - Enter contracts
  - Lead our own procurement process
- Make budget requests directly
- Make decisions / purchases best for the MEO (not what someone else thinks is best for us)

10

Non-profit > Private



- Longevity and stability – Chiefs move on, non-profit lives on (staff continue to get paid)
- The non-profit owns the capital equipment
- Incoming Chief does not need initial start up capital to make payroll before reimbursed
  - $300-400k of your own personal capital
- Chief doesn't pay for any losses
- Better loan rates
- Not paying sales tax on anything – supplies, equipment, rent, vehicles, etc
- Can still get bonuses and other executive "perks"
- PSLF / Can import doctors

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Some Perks of a Non-profit

FREE STUFF

12

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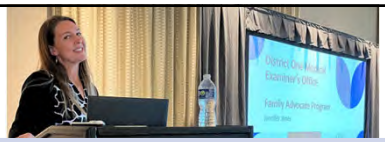
Stuff & Staff



Over $2,500,000 in grants and awards over 2 years

Grant Funded Staff Positions	Epidemiologist – x 5 years Family Advocate – x 1.5 years
Grants / Donations for Stuff	Database access and upgrades Equipment (tablets, computers, vehicles) Construction projects

13

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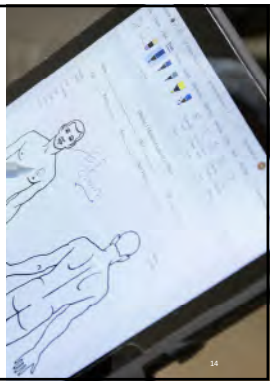
More ways to get Free Stuff

- Donation
  - Wish Lists (Impact 100)
  - Vehicles donated
  - Direct monetary donation to 501(c)3 as a tax write off (staff wellness, training, swag, etc.)
- Partnerships with other non-profits
- Fundraising for a targeted goal (CT scanner, etc.)
- Can directly receive grant funds from state or federal
  - No pass through / red tape!



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Non-profit model benefits our profession directly

15

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Non-Profit - Two Major Positive Impacts

1. Decrease student loan burden for American born graduates
   - Non-profit is a qualifying employer for PSLF (public student loan forgiveness)
2. Decrease workload shortage by supporting visas / importing American trained but foreign-born doctors
   - Non-profit is a qualifying employer to support J1 to H1B visa conversion
   - Via CONRAD30 and other programs specifically for non-profit employment

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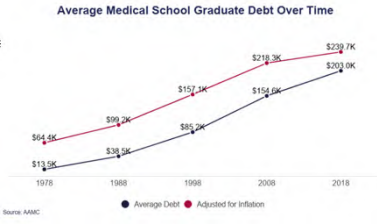
16

Public Student Loan Forgiveness - PSLF

- PSLF – 10 years of qualifying payments made while employed by a qualifying employer
- Average medical school graduate owes $250,000 in total student loan debt (undergraduate and medical school)
- 70% of American Medical School Graduates have student loan debt
- Average monthly repayment cost
  - Residency: $300 to $370 / month
  - Post-residency: $1,600-$2,300 /month



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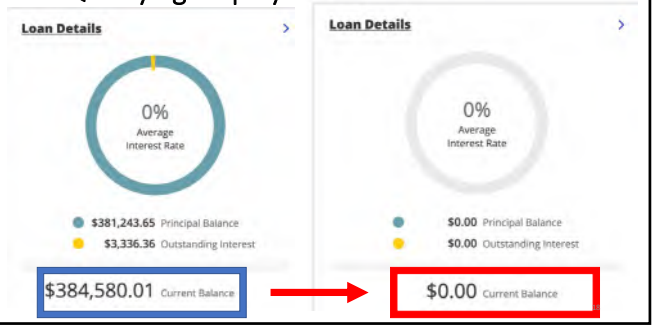
PSLF Qualifying Employer – REAL LIFE



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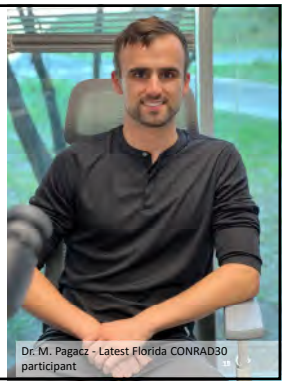
CONRAD30 / Importing Physicians

- 40-50% of all pathology residents are foreign trained physicians
- 29% of 2023 forensic pathology fellows are foreign trained physicians
- Costs of CONRAD30
  - $4-6k fees to government for the visa application process
  - $4-6k in attorneys fees to get the application done right (more than half the battle)
- Other special programs just for rural / underserved areas targeted towards non-profits



Dr. M. Pagacz - Latest Florida CONRAD30 participant

19

How do I make a non-profit happen?

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Where this idea would work

- Conservative areas in the country
- Belief that government should be small / outsource
- Newly established MEOs
- Historically privately run MEO with some controversy
- County run offices with mass exodus
- Community distrust of the MEO
- Those who desire stability and longevity (aka don't want to think about us again for awhile)
- Counties willing to ante up initial start up costs

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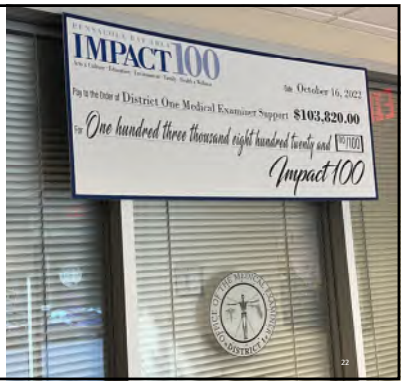
How to Build a Better Board

Look to other successful non-profits for inspiration!



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Executive and Board – A Better Way

Executive

- President ***and*** Chair of the Board – Chief Medical Examiner
- Vice President – Someone with experience running a non-profit
- Vice Chair – Medical Examiner Designate (Director of Operations / Deputy Chief, etc)
- Treasurer – Local County Finance Director OR Accountant
- Secretary – Anyone who wants a title

Board

- ODD NUMBER
- More board members = more people in the community to spread the mission of the MEO
- The CEO/CME is the tie breaker
- ***Stack the board!!***
- Don't get voted off your board!

23

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Board Members – Diverse and Mission Driven

- Executive Directors at local media outlets (newspaper / TV)
- At least 1 non-forensic pathologist from the community
- President / active physician member of the local medical society
- If building a new building – contractors, construction, architects, medical supply people
- Car dealers , local printers / embroidery shops, medical supply, medical waste disposal
- Local charity foundation leaders / philanthropic people with money / influence / their names on buildings
- Elected officials with career stability in city / county / state (bonus if they have a LE or medical background)
- Professor at the local college / university in relevant field of study
- Retirees who still want to be active in the community
- Other local non-profit leaders

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Board Members - Maybe

Potential Conflicts of Interest:

- Local law enforcement (appointed vs. elected)
- Funeral home director
- Tissue / OPO agency
- Prosecuting and criminal defense attorneys
- County attorneys

25

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Stack your board with your people

The OCSO Sheriff's Star Charity is a registered 501(c)(3) nonprofit organization. Our Board of Directors is comprised of Okaloosa County Sheriff's Office members who volunteer their time to support our organization's mission.

17 board members = law enforcement, all but 2 are current OCSO

26

26

… or stack your board with people who can get you stuff / money for your mission

- Sheriff's Trust
- Board = 27 people
  - Sheriff = President AND board member
  - Treasurer = Chief Deputy AND board Member
  - Vice President = someone with finance experience, extensive local non-profit experience and connected to other big charities
  - X 2 Bears = wealthiest people in our county
  - Local contractors (construction, zoning,
  - Local supplies of things (car dealerships, jeweler, insurance)
  - Local non-profit experts (strategic planning, fundraising, elderly people of influence that are used to serving on boards)
  - Local hospital
  - Attorneys from major law firms
  - Philanthropic persons of various talents/connections (insurance, marketing, military, federal contractors, spouses of politicians in state government)
  - Local county government (corrections, finance, administration, property appraiser, clerk of court,) and city mayor
  - Former NFL football player

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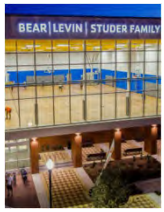
What's in a name?
Ask them to be on your board!



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Sell Your Mission

- Provide transparency
- Longevity
- Reduce tax burden on local governments / residents
- Provide excellence
- Ensure stability in the MEO system for decades to come
- Provide community engagement / betterment through public health collaborations with other non-profits

29

29

Keys to Success

- Two routes:
  - Convert private for-profit business to a non-profit
  - OR – start a non-profit with bare bones board / executive with goal to expand the board
- File the IRS non-profit paperwork
- Get a good attorney, accountant and bookkeeper
- Find persons in the community to become great board members
- Board members must be passionate about the MEO mission
- MUST be connected with the local ELECTEDS (aka the ones who vote/control your budget!)

30

30

Questions?

MEO Circle of Life – Stage 0 (Las Flamas)

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Locum Forensic Pathologists
The Future of Forensic Pathology Workforce

Maneesha Pandey MD
Forensic Pathologist, Forensic Medical of Kansas City and Topeka, LLC, KS

Feng Li MD, JD, PhD
Chief Executive Officer
Forensic Medical Management, & Chief Medical Examiner,
Davidson County, Nashville, TN

Deanna Oleske MD
Interim Chief Medical Examiner
District 1 Medical Examiner's Office
Pensacola, FL

Jeff Lee D.O
Chief Forensic Pathologist & Deputy Coroner
Licking County Coroner's Office
Newark Ohio

57TH Annual National Association of Medical Examiners Conference, October 16, 2023

FORENSIC MEDICAL

1

OFFICE OF THE MEDICAL EXAMINER DISTRICT 1

FORENSIC MEDICAL

LICKING COUNTY CORONER

Authors have no disclosures

2

Defining a Locum Forensic Pathologist (FP)

A Forensic Pathologist who performs autopsies/ external exams/ medical records reviews/testimony over a designated time in exchange for compensation..

The ME/Coroner/Private/Nonprofit agencies does not directly employ you for the work being done

3

Locum Forensic Pathologists

- Independent contractors, self employed
- Business owner
- Hired by an agency- who then subcontracts them

4

Independent contractors

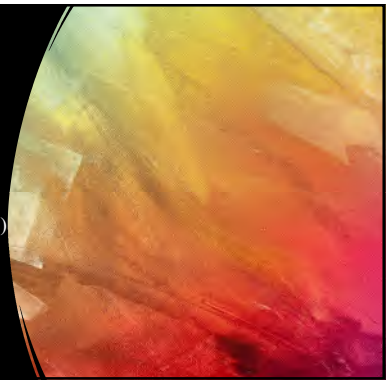
"The general rule is that an individual is an independent contractor if the payer has the right to control or direct only the result of the work and not what will be done and how it will be done."

5

Small Business Owner

The most common forms of business owners are:

- Limited Liability Company (LLC)
- Sole proprietorship
- Partnership
- Corporation
- S corporation



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Working for an agency who then subcontracts the FPs out

Few agencies out there who are hiring FPs and then getting them a contracting Locum job with a Forensic Pathology office.

7

Advantages to being a Locum FP

- Flexible schedules
- Compensation
- Interactions
- Learning different ways of different offices

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Flexible schedules

- You give the dates
- You pick the dates you would like to work from the dates given to you by the office
- You can work as much or as less as you want

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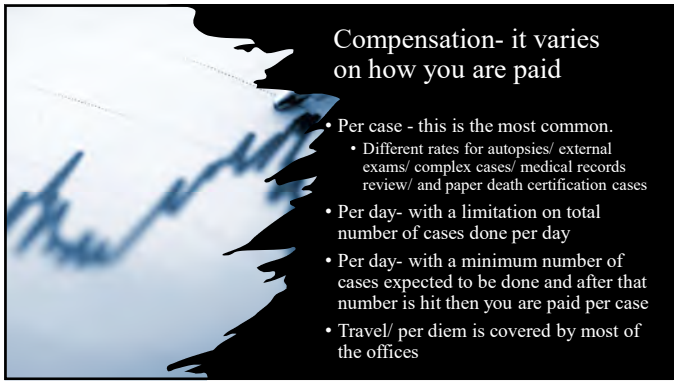
Compensation- it varies on how you are paid
• Per case - this is the most common.
• Different rates for autopsies/ external exams/ complex cases/ medical records review/ and paper death certification cases
• Per day- with a limitation on total number of cases done per day
• Per day- with a minimum number of cases expected to be done and after that number is hit then you are paid per case
• Travel/ per diem is covered by most of the offices

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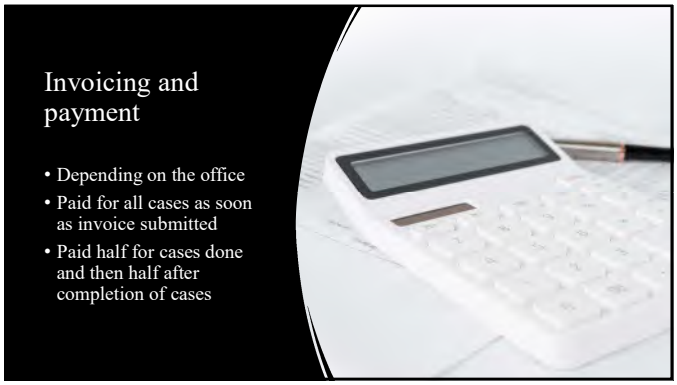
Invoicing and payment
• Depending on the office
• Paid for all cases as soon as invoice submitted
• Paid half for cases done and then half after completion of cases

11


Interactions with other offices
• Extremely satisfying
• Interactions with the local staff doctors/ autopsy technicians/ Investigators- most of the offices are doing the work well and they are not all that much different from each other..
• Learning from each other

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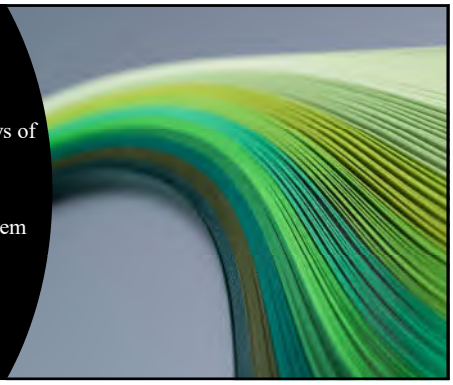
Learning different ways of different offices and jurisdictions

Medical examiner system
Coroner system
Justice of the peace



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Disadvantages to be a Locum FP

- No ladder climbing- not likely to become a Chief
- No say in the office politics
- Travel
- May have to come back for trial and testimony- but you will be paid
- Medical malpractice insurance

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How to succeed as a Locum FP- 5 pillars
• Professionalism
• Pleasant morgue side manner
• Efficiency
• Communication
• Availability

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Professionalism

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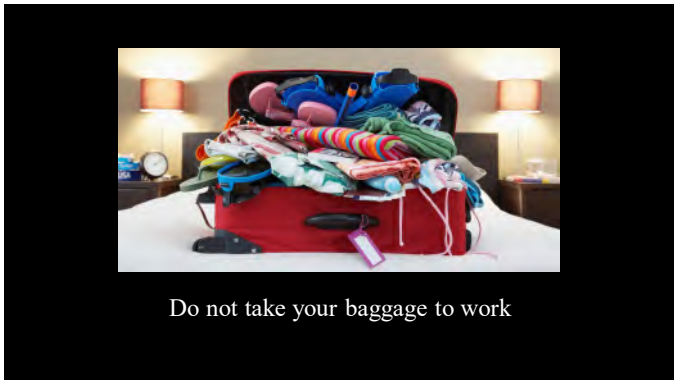
Do not take your baggage to work

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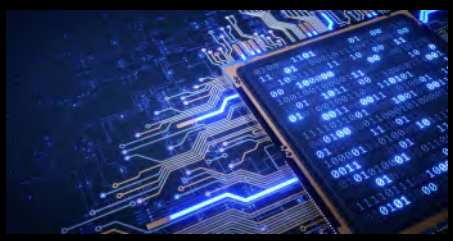

No chip on your shoulder

19

Professionalism you are working for them..

- Each office is different.
- Mostly will give you independence to work
- But sometimes will guide you to phrase the cause of death/ in a certain way..

20

Pleasant morgue side manner..
Most important

21

Morgue side manner

- Respectful
- Listening
- Pleasant attitude

22

Efficiency

- Autopsy stamina
  - Typically, do anywhere from 2 to 10 cases in one day

23

Documentation as soon as possible

- Always dictate/ or record the autopsy findings as soon as possible.
  The key to remaining ahead of the case load.
- Options are
  - To dictate during autopsy
  - To type/ dictate after the completion of autopsies

24

Timely tracking of your cases

- Get a system in place to:
  - Track your tox reports
  - Investigation finding
  - Med recs in real time

25

Triage completion of the cases

Complete the cases as soon as you are able to.. Especially the non complex cases

Use triage manner so that bulk of the cases are signed out as soon as possible.

26

30/60/90 days….

- Try to complete a case within a few days of receiving toxicology report..
- Always remember we are providing a service to family of the deceased
- That death certificate is as important as giving a timely treatment to a live patient. Many are depending you..

27

28

Communication/ transparency

- Always communicate quickly with the staff
- Develop the best communication strategies with each office
- Encourage them to give you an email/ or contact app to communicate about cases/ toxicology/ any possible court cases

29

Availability

- Give your available dates to the offices
- Do not change the dates too much as the office is depending on you

30

Tools for doing FP Locums

- Laptop/ Smart Tablets
- Smart Phone
- Microscope
- Scrubs
- Keeping track of your cases
- A dedicated office space in your home
- P.O box
- Access to an attorney
- Contract

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Negotiating contract for Locum FP

Very important to have a contract in place as a Locum FP- eg to cover any possible trial/ testimony

32

Some contract tips to consider

- Appropriate rates- vary greatly
- Complex cases- build the compensation in your rate/ or charge separately
- Daily rate or per case rate
- Travel reimbursement/ or build it in your rate
- There is enough work out there for all of us.
- Don't feel that you are obliged to continue to work at a place

33

Change the unfair contract

Remember that all the contracts are negotiable..

The worst that will happen is that they will not use your services.

It's not personal for you or for them..

You do not want to work underpaid, unhappy and getting screwed when time comes

34

Red flags

- Micromanagement
- Not getting paid timely
- Bad office environment
- Inefficient autopsy technicians/investigaters
- Inefficient workflow
- Money is not the only driving force..

35

You are ready to start working as a Locum Forensic Pathologist

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IRS terms to keep in mind

W-9
1099

https://www.irs.gov/pub/irs-pdf/f1099nec.pdf

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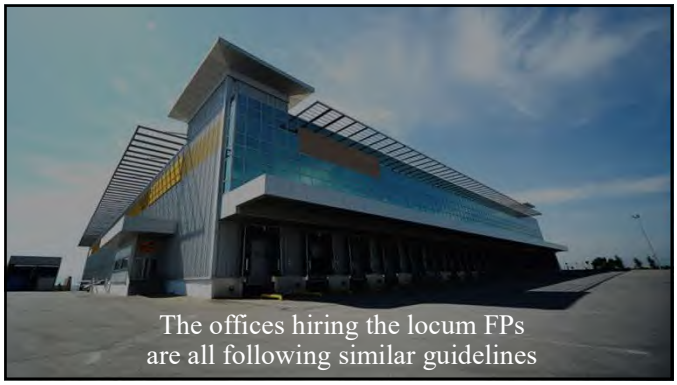


40

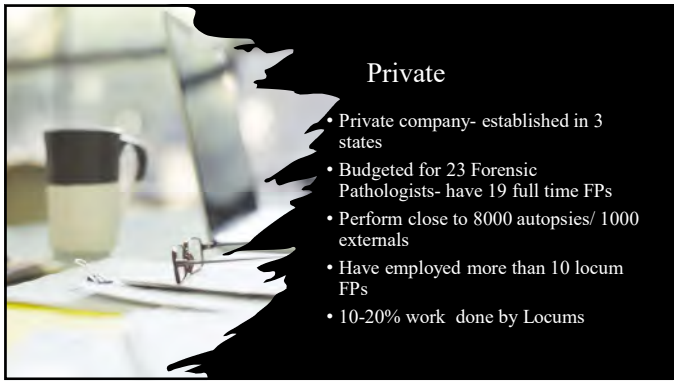
Who is hiring the Locum FPs

- Private
- Non-Profit
- Government/ County
  - Coroner system
  - Medical Examiner system

41

Chief Forensic Pathologists of four different types of medicolegal death investigation systems were asked about using Locum FPs

42



Private

- Private company- established in 3 states
- Budgeted for 23 Forensic Pathologists- have 19 full time FPs
- Perform close to 8000 autopsies/ 1000 externals
- Have employed more than 10 locum FPs
- 10-20% work done by Locums

43

Non-Profit

Medium sized Medical Examiner's office

- Multi county office, independent nonprofit funded by 4 counties
- 3 full time Forensic Pathologists
- Reliable rotation of 3-4 locum doctors
- 20% bodies examined by locums/ 90% paper cases

44

Coroner system

- One full time Forensic Pathologist
- Approx 280-300 autopsies annually for 12 counties
- Growing last 5 years
- 20-25% work done by Locum- at 2 days a month- looking for 1 week at a time
- The cases are saved for 3 days prior to Locum coming- So essentially the FP has 6 days of coverage in a month

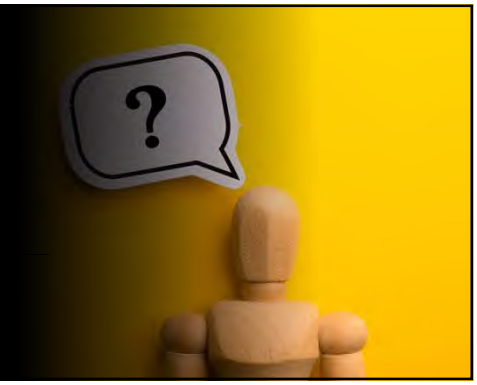
45

Medical Examiner System- Govt/County

- 6 full time Forensic Pathologists
- Approx 3000 cases
- Less than 2% cases done by locums
- Looking for a week at a time
- Limitations of type of cases
- Good experience for trainees to see different FPs at work

46

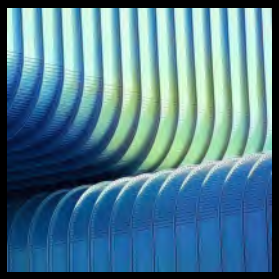
What are they saying about Locum FPs



47

Locum FPs are good for our field

- We learn to be better doctors and leaders
- Support innovation
- Exchange ideas
- Unify language choices for reports/ complex cases

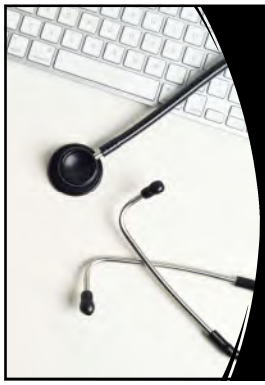


48

Great need nationally esp in smaller jurisdictions- where recruitment is difficult

- Regional Locum groups will specialize in a region of the country
- Eg locum FPs groups rotating around
  - Great lakes region
  - Midwest/Plains states
  - Rural South
  - Area of the Rockies

49



Assessing Locum FP and the work they do

- QA program to evaluate all reports by all pathologists
- Checking reputation and references
- Using personal recommendations

50

Using the services of Locum FPs

- Similar to hiring an FP employee
- Conscientious
- Easy to work
- Knowledgeable
- Flexible

51

Expectations for Locum FP's

Same as full time employees

- Board certification
- Professionalism
- Work ethic/ efficiency- take full responsibilities on all the cases
- Good personality – work well with staff/ good attitude and be respectful
- Good communication skills
- Flexible in scheduling

52

Any nonprofessional incidents

If you are unpleasant/unprofessional your services will not be used

Not too many such incidents reported

53

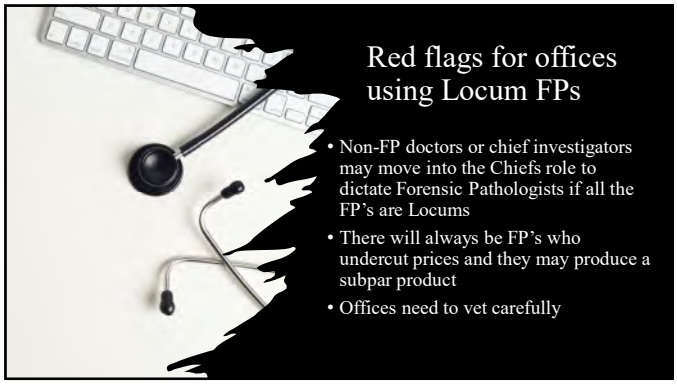
Limitations of using Locum FPs

FPs do not typically do Homicides/ babies

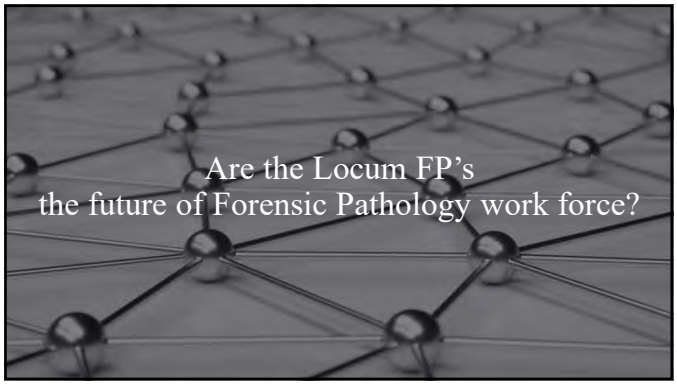
This would change if…

- More district attorneys/ prosecutor's offices can agree to do Zoom/ or online testimony
- Agree to pay for testimony/ deposition by the Locum FPs

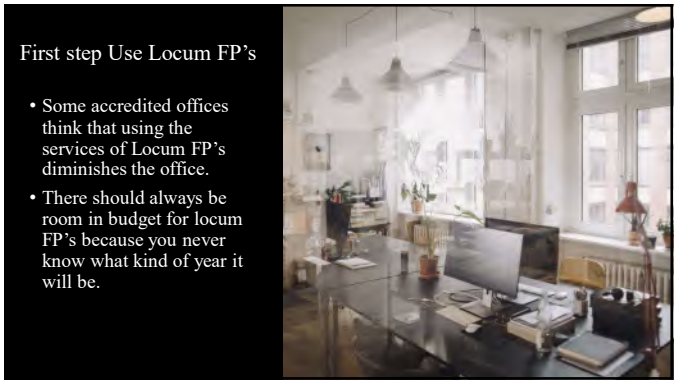
54


Red flags for offices using Locum FPs
• Non-FP doctors or chief investigators may move into the Chiefs role to dictate Forensic Pathologists if all the FP's are Locums
• There will always be FP's who undercut prices and they may produce a subpar product
• Offices need to vet carefully

55


Are the Locum FP's
the future of Forensic Pathology work force?

56


First step Use Locum FP's
• Some accredited offices think that using the services of Locum FP's diminishes the office.
• There should always be room in budget for locum FP's because you never know what kind of year it will be.

57

When are the Locum FPs primarily used

- Mainly for making up extra workload
- Usually will rely on the regular forensic pathologist workforce

58

Recommend to use Locum FPs

- Every chief should routinely used locum FPs so that the funding parties know that working through a massive case load is not acceptable.
- Always budget for Locum doctors

59

Eventhough they will never completely replace

Locum FPs are important for the future workforce

- To help with workload
- Creation of regional locum FP groups
- Sharing professional knowledge
- Exchanging of ideas/ supporting innovation

60

61

The Value of a Long-Term Unidentified Coordinator

NAME 2023 Annual Meeting

1

The Department of Legal Medicine, VCU

The Office of the Chief Medical Examiner, Virginia Department of Health

2

Virginia OCME

- 4 district offices
- 16 forensic paths
- 31 MDIs

3

Virginia OCME-Death Stats 2021

- Total cases accepted 9605
- Jurisdictional authority given by Code of Virginia
- Does not count total deaths investigated, family phone calls, funeral home calls, OPO calls

4

Long Term Unidentified Coordinator (LTUC)

- FT, created in 2020, filled in 2021
- Previous MDI 8 years, death surveillance 2 years
- Ease burden from MDI/paths

5

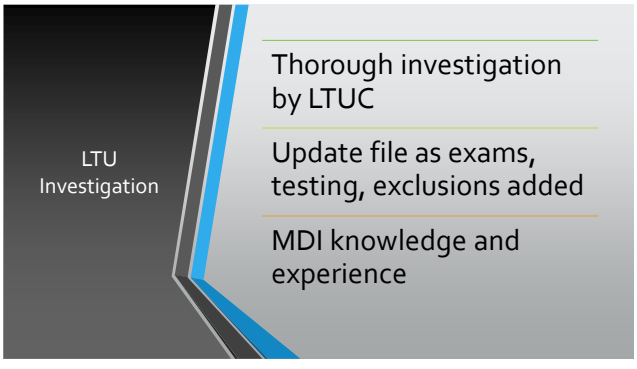
LTU Cases Prior to 2021

- Not enough time to dedicate
- Staff overwhelmed with current investigations

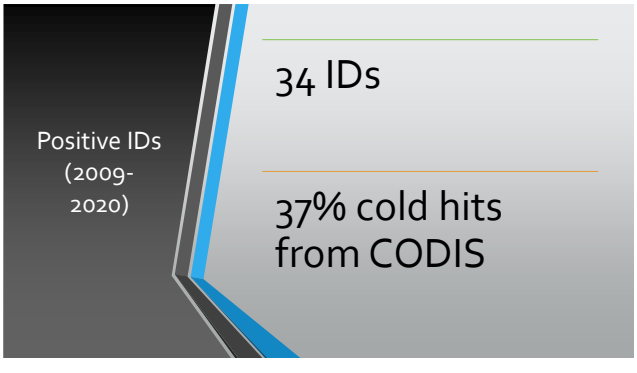
6


LTU Cases with a LTUC
Dedicated care and coordination
One person to contact
• Local LEA
• NamUs/RTI
• State LEA
NCMEC

7


LTU Investigation
Thorough investigation by LTUC
Update file as exams, testing, exclusions added
MDI knowledge and experience

8

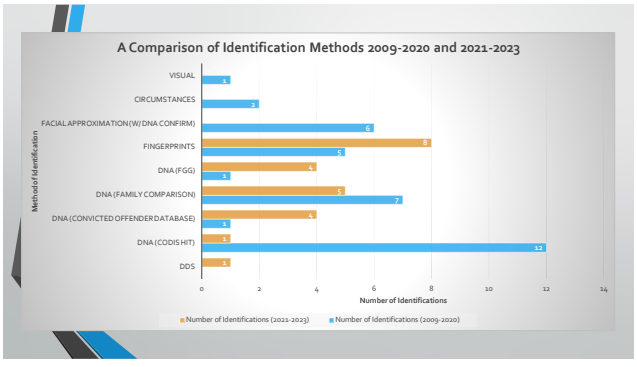

Positive IDs (2009-2020)
34 IDs
37% cold hits from CODIS

9

Positive IDs (2021-2023)

- 27 IDs
- 60% (family comparison, FGG, convicted offender*)
- 35% fingerprints- resubmission of fingerprints

10



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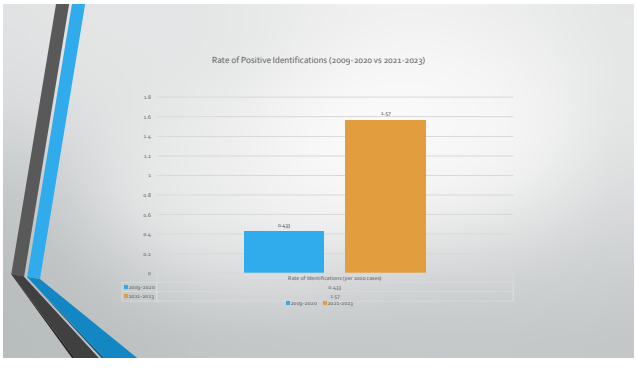

12

*Convicted Offender Database

- State law determines requirements for sample submission
- Virginia: anyone who commits a felony is required
- Prior to 2021-1 ID
- September 2022 and on-4 IDs

13

Other Data

- Prior to LTUC, avg 3 IDs/yr
- Since LTUC, avg 11 IDs/yr
- LTUC intakes 2-3 new cases per year
- Previous LTU cases-no longer LTU
- "New" cases found

14

Other Bonuses

- Apply for grants
- Outreach to LEA
- One person to f/u
  - LEA
  - Family/friends/NOK

15

Conclusions

- Increase in violent, overdose, accidental deaths
- No increase in staff to match increase in deaths
- LTUC eases burden, MDI/paths can focus on current
- Streamline cases, more IDs, thorough investigation
- One contact person

16

Questions?

Lara Newell

Long Term Unidentified Coordinator

Virginia OCME

Lara.newell@vdh.virginia.gov

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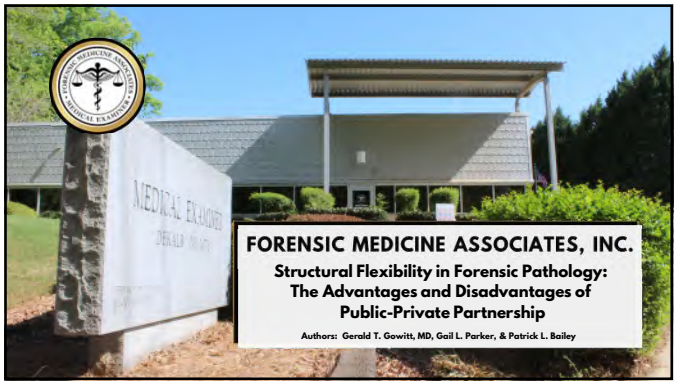


1

PRESENTATION OUTLINE

What is a Public-Private Partnership (PPP)?

Office Structure Overview

Introduction to the Private Sector

A Brief History of DeKalb County Medical Examiners & Forensic Medicine Associates, Inc.

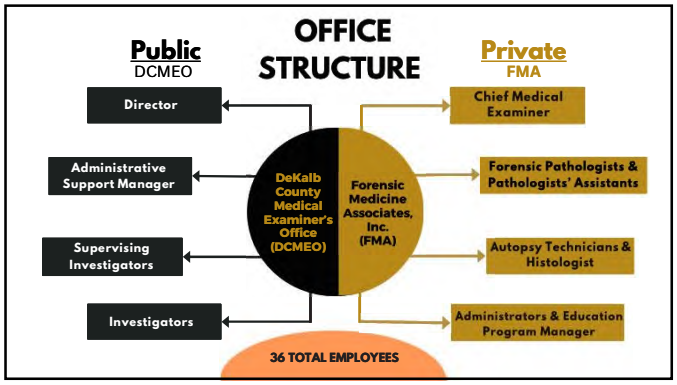
Advantages & Disadvantages of the Public Private Medical Examiner Relationship

2

WHAT IS A PUBLIC PRIVATE PARTNERSHIP (PPP)?

A PPP IS A FORM OF LONG-TERM AGREEMENT BETWEEN A GOVERNMENT AND A PRIVATE ENTITY, THROUGH WHICH THE GOVERNMENT AND PRIVATE PARTY JOINTLY INVEST IN THE PROVISION OF PUBLIC HEALTH AND SAFETY SERVICES.

3



4

OVERVIEW OF THE PUBLIC SECTOR - DCMEO

7.06%
DeKalb County is the 4th largest county in the state of Georgia, accounting for over 7% of the total population

Population: 762,820

Total Deaths in DeKalb County, GA	5,645
Cases Reported to Medical Examiner	2,479
Accepted Jurisdiction	1,421
Full Autopsy	463
Limited autopsy	277
External Examination	252
Number of deaths certified without postmortem examination (Sign-Out)	429
Declined Jurisdiction	1,058

2022 Annual Budget $3,513,517

State of Georgia

5

OVERVIEW OF THE PRIVATE SECTOR

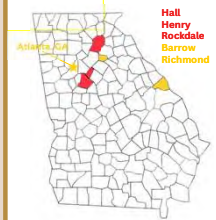
FMA

A PROVISION IN FMA'S PPP AGREEMENT ALLOWS FMA TO UTILIZE THE FACILITY FOR FORENSIC PATHOLOGY SERVICES OTHER THAN DEKALB COUNTY.

FMA ALSO HAS AGREEMENTS WITH RURAL CORONER'S OFFICES TO PROVIDE MEDICAL EXAMINER'S SERVICES. AS A RESULT OF THIS ARRANGEMENT, FMA IS ABLE TO PROVIDE ASSISTANCE TO AN UNDERSERVED ME/C SYSTEM AND EMPLOY ADDITIONAL PERSONNEL.

FMA Annual Budget $3,824,703
The PPP agreement includes an annual escalator clause

Coroner Counties FMA Provides Medical Examiners Services to:



STATE OF GEORGIA

*No potentially prosecutable case are accepted from coroner's counties.

6

TOTAL POPULATION SERVED

DCMEO Population Served	FMA Population Served	Total Population Served
762,820	633,334	1,396,154

APPROXIMATELY 13% OF GEORGIA'S POPULATION IS SERVED BY DCMEO & FMA COLLECTIVELY

7

QUALIFICATIONS FOR PARTICIPATING IN A PUBLIC-PRIVATE PARTNERSHIP AS THE PRIVATE SECTOR

- ABILITY TO WRITE A COST AND TECHNICAL PROPOSAL
- ENTREPRENEURIAL SPIRIT
- GENERAL BUSINESS UNDERSTANDING
- DEVELOP A BUSINESS PLAN
- WILLINGNESS TO COLLABORATE WITH GOVERNING AUTHORITIES IN ORDER TO PROVIDE INNOVATIVE SERVICE DELIVERY

8

HISTORY OF THE OFFICE

1980

Coroner's System Abolished DeKalb County Medical Examiner's Office Established

1994

Forensic Medicine Associates, Inc. was Established Providing Service to Rural Coroners in Georgia

2000

Forensic Medicine Associates, Inc. Responded to a Request for Proposal (RFP) and Secured an Agreement with DeKalb County for Medical Examiner Services

9

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13

ADVANTAGES

Increased Flexibility

- Less bureaucratic regulations
- No fixed salary range (salary is market-driven)
- Flexible hours
- More control over workplace culture
- A greater degree of autonomy
- Ability to accept outside work
- Adaptable to operational changes

Operationally Efficient

- Use of preferred vendors
- Use the case management system that best fits your office needs
- Open positions do not need to be advertised
- Immediate staffing solutions

*Georgia is an at-will state: As a result of employee disposition, employer-employee relations are simplified

DISADVANTAGES

Increased Administrative Burden

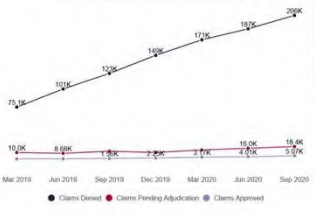
- Periodic contract compliance review
- Adherence to State and Federal regulations
- Limited employee leave
- Must maintain commercial and professional insurances

14

Barrier: Lack of Government Sponsored Public Service Loan Forgiveness (PSLF)

PUBLIC SERVICE LOAN FORGIVENESS

PSLF Application Adjudication Progress



ED's PSLF Discharge Application Adjudication Progress (for Applications Submitted Since Nov. 30, 2020)

	Claims Approved	Claims Denied*	Claims Pending
June 2021	4,848	241,910	175,013
May 2021	4,214	270,002	167,125
Apr 2021	3,458	241,910	145,965

No reports published from December 2020 to March 2021

* This includes claims denied due to information missing from the applicant's submitted forms.

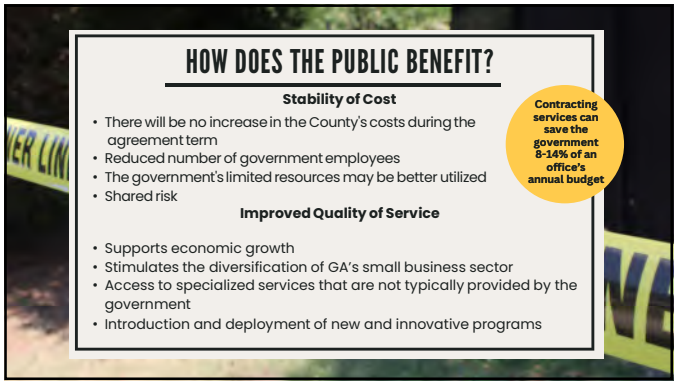
AMONG DENIED CLAIMS, 30% ARE DENIED DUE TO INCOMPLETE PAPERWORK.

PRIOR TO NOVEMBER 2020, ONLY 0.7% OF ELIGIBLE BORROWERS EVENTUALLY BENEFITED FROM STUDENT LOAN FORGIVENESS.

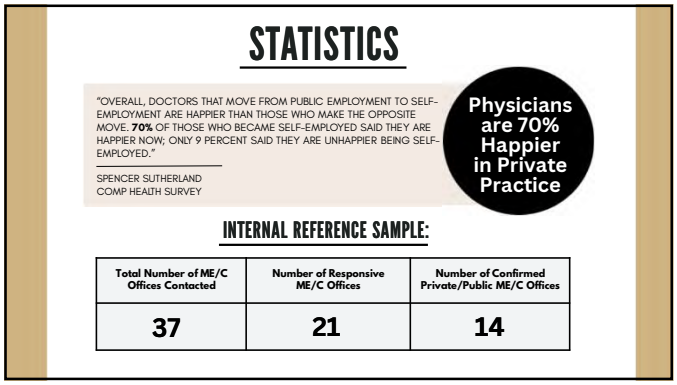
THE MOST CURRENT DATA REFLECTS PSLF GRANTEES ARE LESS THAN 2.2% (98% OF APPLICANTS ARE DENIED)

35% OF PSLF APPLICATIONS HAVE YET TO BE PROCESSED

15


HOW DOES THE PUBLIC BENEFIT?
Stability of Cost
• There will be no increase in the County's costs during the agreement term
• Reduced number of government employees
• The government's limited resources may be better utilized
• Shared risk
Contracting services can save the government 8-14% of an office's annual budget
Improved Quality of Service
• Supports economic growth
• Stimulates the diversification of GA's small business sector
• Access to specialized services that are not typically provided by the government
• Introduction and deployment of new and innovative programs

16


STATISTICS
"OVERALL, DOCTORS THAT MOVE FROM PUBLIC EMPLOYMENT TO SELF-EMPLOYMENT ARE HAPPIER THAN THOSE WHO MAKE THE OPPOSITE MOVE. 70% OF THOSE WHO BECAME SELF-EMPLOYED SAID THEY ARE HAPPIER NOW; ONLY 9 PERCENT SAID THEY ARE UNHAPPIER BEING SELF-EMPLOYED."
SPENCER SUTHERLAND
COMP HEALTH SURVEY
Physicians are 70% Happier in Private Practice
INTERNAL REFERENCE SAMPLE:
Total Number of ME/C Offices Contacted
37
Number of Responsive ME/C Offices
21
Number of Confirmed Private/Public ME/C Offices
14

17


IS A PUBLIC PRIVATE PARTNERSHIP RIGHT FOR YOU?
Consider what you have seen today. If you have questions visit our vendor booth before the end of the day.
Vendor Booth 203

18

CITATIONS

- HANSON, MELANIE. "STUDENT LOAN FORGIVENESS STATISTICS" EDUCATIONDATA.ORG, JANUARY 1, 2022, https://educationdata.org/student-loan-forgiveness-statistics
- THE CASE FOR CONTRACTING OUT: A VITAL TOOL TO HELP BALANCE WASHINGTON'S BUDGET AND IMPROVE PUBLIC SERVICES A JOINT RESEARCH SERIES FROM THE WASHINGTON ROUNDTABLE AND WASHINGTON RESEARCH COUNCIL - RELEASED DECEMBER 2010 http://waroundtable.com/pdf/resources/ThriveWATheCaseforContractingOut.pdf
- SPENCER SUTHERLAND "WHO'S HAPPIER: EMPLOYED OR PRIVATE PRACTICE PHYSICIANS? HTTPS://COMPHEALTH.COM/RESOURCES/WHOS-HAPPIER-EMPLOYED-OR-PRIVATE-PRACTICE-PHYSICIANS#:~:TEXT=HAPPIER%20AFTER%20THE%20MOVE%3F,ARE%20UNHAPPIER%20BEING%20SELF%2DEMPLOYED
- UNPLUBLISHED DATA FROM AN INTERNAL REFERENCE STUDY

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PHONE NUMBER
(404) 508-3507

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A 10 year review of pediatric deaths investigated by the Jefferson County Coroner/ Medical Examiner's Office: What it "means"

Alyssa Lee, M.D., M.S.; Brandi McCleskey, M.D.

UAB MEDICINE

1

Outline

- Discuss pediatric autopsies and how we determine means of death
- Lookback over 10 years of data for 2 pediatric populations
- Discuss how these findings might impact the Jefferson County Community

UAB MEDICINE

2

Background

UAB MEDICINE

3

The forensic pathologist shall perform a forensic autopsy when:

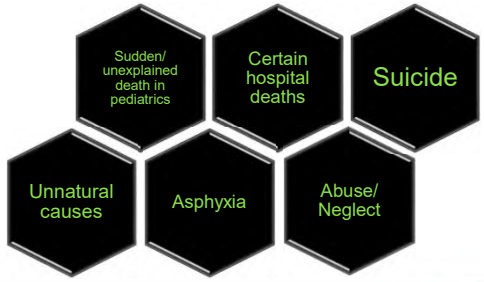
B3.1 the death is known or suspected to have been caused by apparent criminal violence.
B3.2 the death is unexpected and unexplained in an infant or child.
B3.3 the death is associated with police action.
B3.4 the death is apparently non-natural and in custody of a local, state, or federal institution.
B3.5 the death is due to acute workplace injury.*
B3.6 the death is caused by apparent electrocution.*
B3.7 the death is by apparent intoxication by alcohol, drugs, or poison, unless a significant interval has passed, and the medical findings and absence of trauma are well documented.
B3.8 the death is caused by unwitnessed or suspected drowning.*
B3.9 the body is unidentified and the autopsy may aid in identification.
B3.10 the body is skeletonized.
B3.11 the body is charred.
B3.12 the forensic pathologist deems a forensic autopsy is necessary to determine cause or manner of death, or document injuries/disease, or collect evidence.
B3.13 the deceased is involved in a motor vehicle incident and an autopsy is necessary to document injuries and/or determine the cause of death.

* unless sufficient antemortem medical evaluation has adequately documented findings and issues of concern that would otherwise have required autopsy performance.

NAME 2016

4

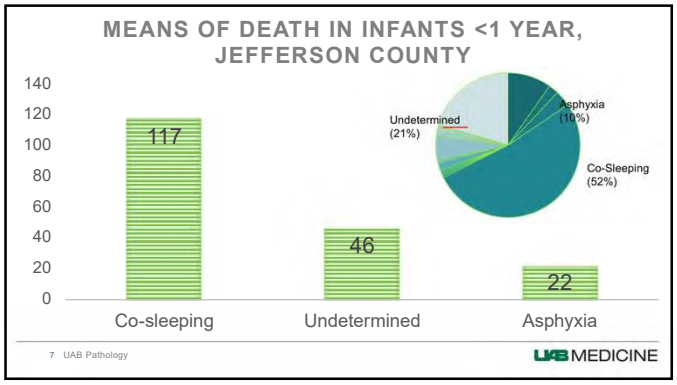
What pediatric deaths are investigated?



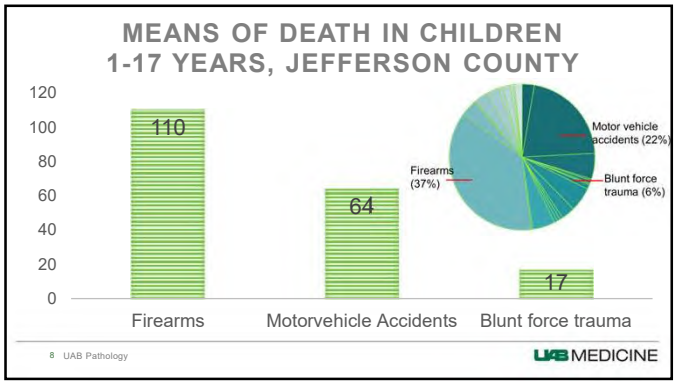
5

10 year data from Jefferson County Coroner/ Medical Examiner's Office in Birmingham, AL

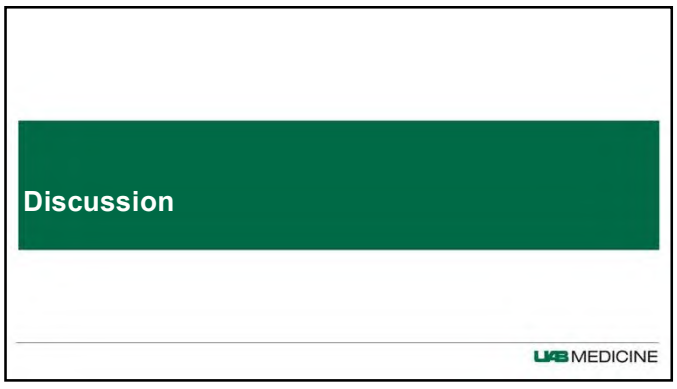
6


MEANS OF DEATH IN INFANTS <1 YEAR, JEFFERSON COUNTY
140
120
100
80
60
40
20
0
117
46
22
Co-sleeping
Undetermined
Asphyxia
Undetermined (21%)
Asphyxia (10%)
Co-Sleeping (52%)
7 UAB Pathology
UAB MEDICINE

7


MEANS OF DEATH IN CHILDREN 1-17 YEARS, JEFFERSON COUNTY
120
100
80
60
40
20
0
110
64
17
Firearms
Motorvehicle Accidents
Blunt force trauma
Firearms (37%)
Motor vehicle accidents (22%)
Blunt force trauma (6%)
8 UAB Pathology
UAB MEDICINE

8


Discussion
UAB MEDICINE

9

Further evaluation of undetermined means of death in infants <1 year

- 22 of the 46 were called sudden unexplained death*
- 24 of the 46 undetermined

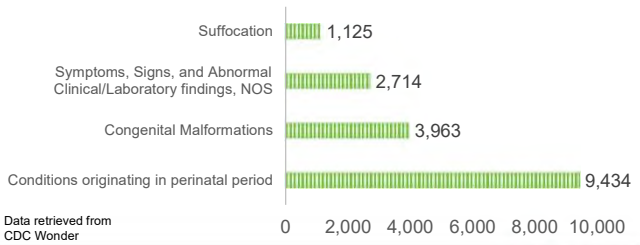
10

Further evaluation of asphyxia in infants <1 year

- 2 positional
- 3 positional with aspiration of gastric contents
- 4 asphyxia with bed contents
- 13 unspecified but involving mattress, pillows, couch, or bedding

11

LEADING MEANS OF DEATH IN INFANTS <1, USA, 2021



Data retrieved from CDC Wonder

12

Public Health Initiatives for Safe Sleep in Jefferson County

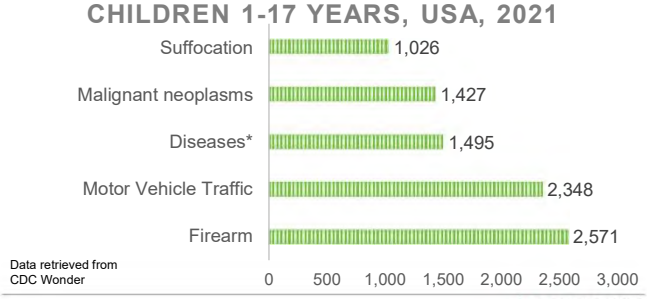
Alabama Collaborative on Safe Sleep

Alabama Safe Sleep Education Awareness

- Research group that provides sleep training and a Pack 'n Play to parents/ caregiver
- Provide materials that adhere to the American Academy of Pediatrics' safe-sleep guidelines

13

LEADING MEANS OF DEATH IN CHILDREN 1-17 YEARS, USA, 2021



Data retrieved from CDC Wonder

14

Common Ground Violence Reduction Initiative

Habilitation
Empowerment
Accountability
Therapy

COMMON GROUND
A Restorative Justice Program
A Place To Build Consensus And Rebuild Community

15

Citations

- Alabama Public Health. (n.d.). *Safe sleep*. Safe Sleep | Alabama Department of Public Health (ADPH). https://www.alabamapublichealth.gov/perinatal/safe-sleep.html
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11.4 A Case of Fatal Infantile Head injury with Complex Bi-parietal Skull Fractures: Can an Accidental Short Fall from Parental Standing Height be the Explanation?

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EORLA

Disclosures of Conflicts of Interest

- No financial Conflicts of Interests.

Learning Objectives

By the end of the presentation, participants will be able to

1. Describe the usual clinical presentation and pathological findings of domestic accidental short falls in infants.
2. Discuss the assessment of bi-parietal skull fractures in infants.
3. Discuss the interpretation of bi-parietal skull fractures in infants to distinguish accidental from non-accidental injury.

Case History

Case History

- 4/12 F infant; died in hospital x 4 days on a ventilator; presented in comatose state
- Hx of allegedly slipping out of father's arms from shoulder height, falling onto carpeted floor with occipital impact; father had been attempting to stand up from seated position
- CT Head:
  - large extracranial soft tissue swelling of right parieto-occipital region+
  - widened right frontal and squamous sutures deep to that area +
  - extra-axial hematoma deep to the widened suture.
- Ophthalmological examination at a tertiary referral centre
  - intra-retinal and pre-retinal hemorrhages of left fundus.
- Repeat CT scan identified HIE.
- No neurological recovery.

Fatal Intentional injury

Background

- Father had been caring for infant as mother was hospitalized
- Father had just completed week of night shifts
- Difficult to feed infant

Scene Examination

- Fall surface:
  - carpeted floor
  - 0.9 cm thick carpet over + 0.8 cm thick underlayer.
  - smooth concrete floor
  - carpet was not worn;
  - laid down x 16/12 prior.

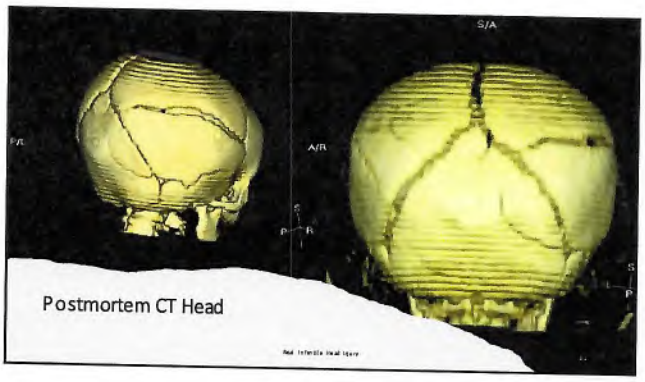
Postmortem Imaging

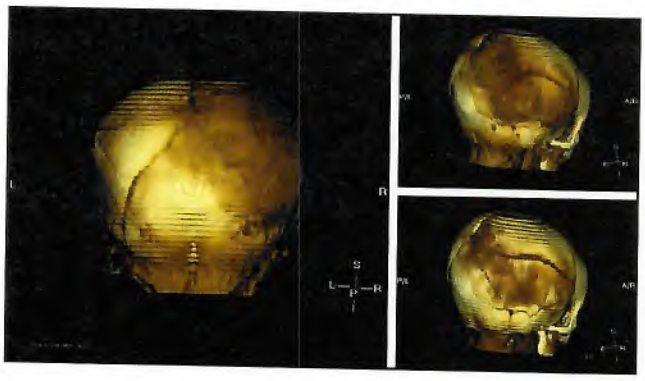
Skeletal survey

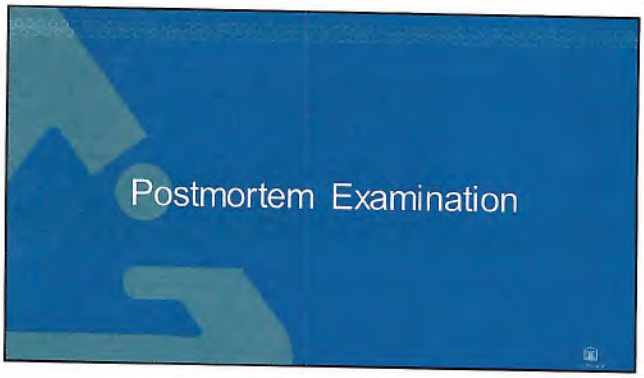
- bilateral fractures of the parietal bones *(partly diastatic on the right; branched posteriorly on the left)*.
- extensive bilateral soft tissue swelling of the scalp, R>L.
- widened, linear fracture of right parietal bone.
- widened, branched, Y-shaped fracture of left parietal bone.

- **Radiological opinion:**
  - complex, bilateral skull fractures indicated high energy impact > what is usually generated in accidental falls in a domestic environment.

Fatal Infantile Head Injury 10

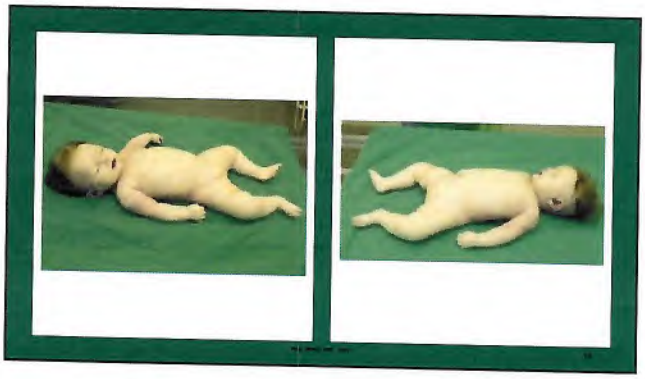

S/A
P/R
A/R
Postmortem CT Head

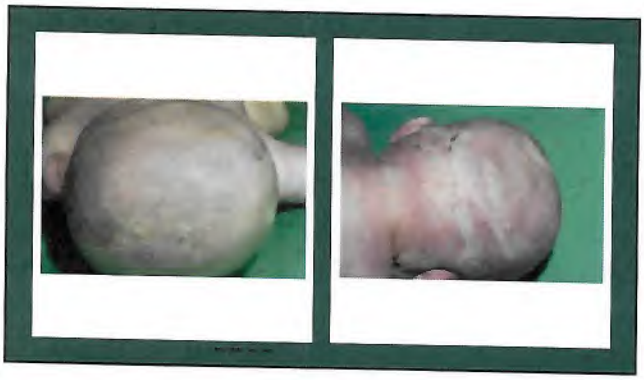


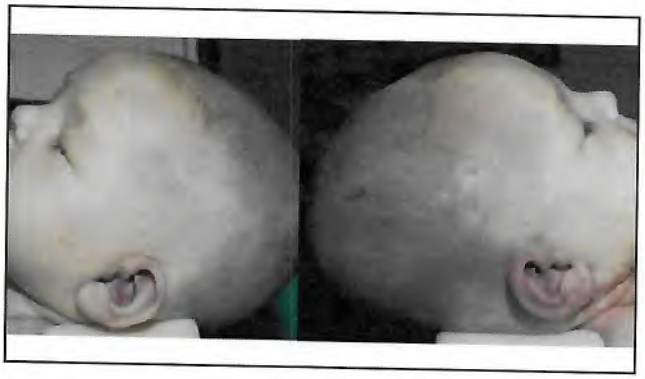

Postmortem Examination

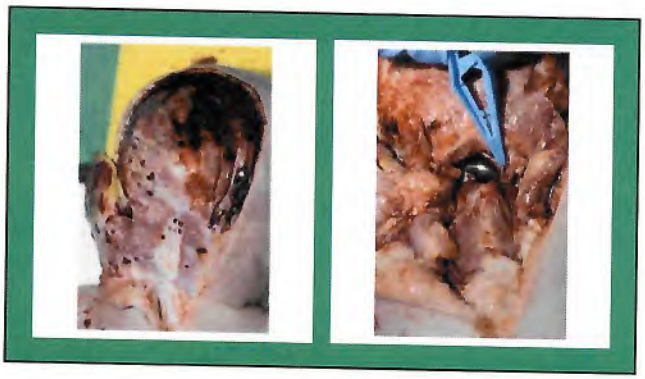
Postmortem Examination

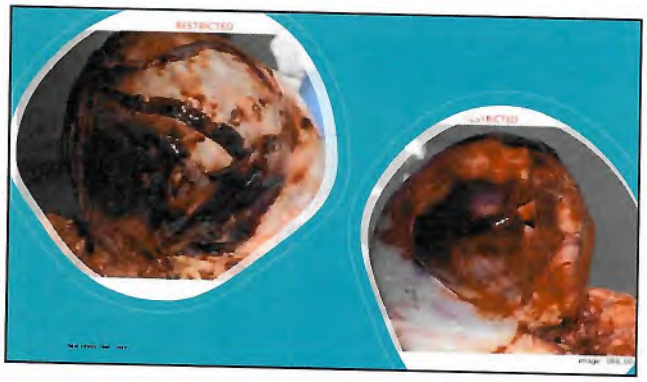
- Performed x 4/7 survival
- No evidence of occipital (or other impact) injury of the scalp
- Large complex bi-parietal skull fractures with bruising and swelling of the overlying subscalp tissues.
- Granular extradural hematoma over the parietal fractures
- Localised right subdural hemorrhage subjacent to fracture.







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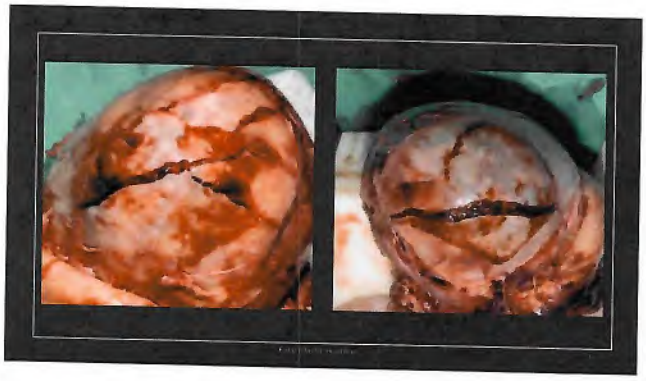

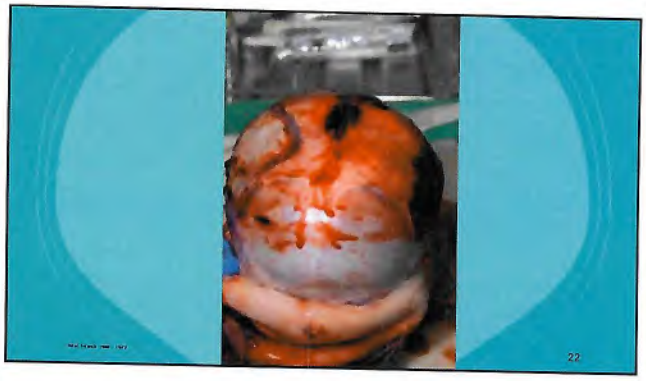
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Fatal Infant Head Injury
23


Fatal Infant Head Injury
24


Fatal Infant Head Injury
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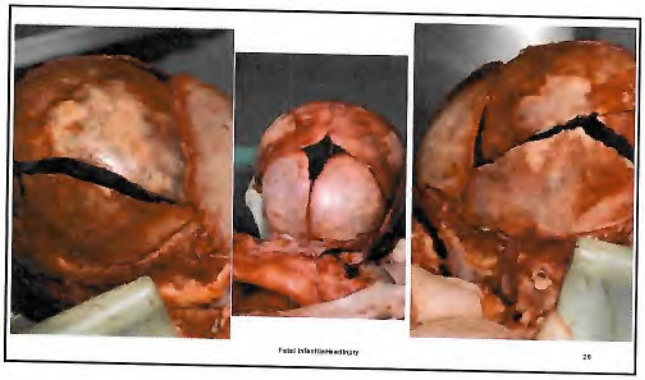
Fetal Infanticide/Autopsy
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Neuropathology

Neuropathology

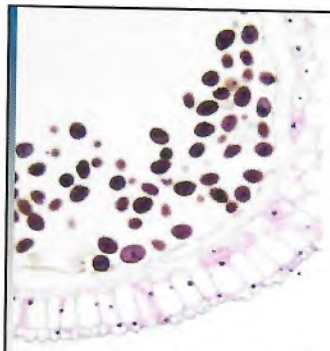
Brain and Spinal Cord

- Hypoxic-ischemic encephalopathy
- Subdural hemorrhage
- Pattern of axonal injury more typical of traumatic origin (but should be interpreted with caution due to the extensive HIE)
- Subdural hemorrhage consistent with 4/7 days
- Subdural blood along the spinal cord with extension along some spinal nerve roots.

Interpretation of Neuropathology Findings

- Consistent with TBI with HIE ***but***
- Neuropathology alone cannot distinguish accidental vs inflicted head injury.
- *Comment: Neuropathology of fatal low level pediatric falls suffers from incomplete, poorly described features with no such historical case having been subjected to APP immunohistochemistry.*
- Consistent with severe, fatal traumatic BFHI ***which did not allow confident discrimination of the mechanism in isolation.***

Ophthalmic Pathology



Ophthalmic Pathology

- ***Nature and extent of the left retinal hemorrhages more extensive than would be expected from simple short fall onto carpeted floor.***
- In isolation, eye pathology findings *cannnot exclude an accidental mechanism.*

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Clinicopathological Interpretation

Interpretation of Findings

- ***Holistic consideration of radiological, PM, neuropath and ophthalmic path findings indicated that father's account was not credible.***
  - **bilaterality and complex nature of the parietal fractures** (indicative of non-accidental manner of causation with two separate severe blunt force impacts of head) although *theoretically possible* that single side-to- side compressive blunt impact of head also feasible*.
- Hiss and Kahana (1995)*: mirror image skull fractures may occur with possible injurious acts being:
  - (i) **forceful stomp on the head** whilst it is on the floor (not excluded),
  - (ii) **crushing of the head between the body of a carer and floor on falling** (no such explanation offered)
  - (iii) **entrapment of an infant's head between a car door** on forceful closure of the door *(with associated patterned and unpatterned bruises and abrasions of the scalp but none present in this case).*

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Required severe degree of force was inconsistent with having been generated in an accidental manner in a simple, single short distance fall within a domestic environment from a height of approximately 4 feet onto a carpeted floor.

Nature of these fractures were more consistent with two separate forceful impacts of the head onto a hard, flat surface such as a wall or floor (based, swung by the ankles or thrown).

Fatal Infantile Head Injury 35

Defence Opinion

- Second autopsy performed by another forensic pathologist
- Pathological findings confirmed
- Defence pathologist's opinion:
  - *theoretical possibility that single occipital impact from fall as described could have caused the complex bilateral parietal fractures ……..*

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Case Outcome

- Defendant pled guilty to manslaughter and plea accepted
- Five (5) year sentence
- Admitted throwing baby on floor in exasperation
- Had been struggling to feed her and was not coping

Ben Smith jailed for killing baby daughter Mia

Fatal Infantile Head Injury 37

[illegible] 2015: Now released and living back in Wakefield

May 2012

Wakefield dad jailed for killing his crying baby girl

A father who killed his four-month-old daughter when he threw her to the floor in "exasperation" has been jailed for five years at Leeds Crown Court.

The judge accepted Ben Smith, 34, of Netherton Lane, Wakefield, was at the "end of his tether" when he fatally injured Mia in December 2009.

The tiny babies suffered injuries including a complex double-skull fracture at Worrall Road, Kettlethorpe, West Yorkshire, on 22 December 2009.

She died four days later on Christmas morning.

Smith denied murder but admitted manslaughter.

The court heard he had just worked a week of night shifts in a supermarket warehouse when he found himself looking after his daughter when his wife was admitted to hospital with shingles.

Smith originally told police that Mia, who suffered from colic, had simply slipped from his arms and banged her head on the floor.

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"Can a simple short fall cause fatal head injury in an infant?"

Fatal Infantile Head Injury

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REVIEW ARTICLE

The Role of Epidemiology in Determining If a Simple Short Fall Can Cause Fatal Head Injury in An Infant

A Subject Review and Reflection

Ehsani, Johnathon P. MPH*; Ibrahim, Joseph E. PhD*; Bugeja, Lyndal BA(Hons)†; Cordner, Stephen FRCPA*†

Author Information

The American Journal of Forensic Medicine and Pathology 31(3):p 287-298, September 2010. | DOI: 10.1097/PAF.0b013e3181db[illegible]

Metrics

40

Pediatric short-distance household falls: biomechanics and associated injury severity

Affiliations + expand

PMID: 21094308 DOI:

Abstract

41

Restricted access Research article First published online October 16, 2011

The potential effects of floor impact surfaces on infant head injury outcome during a short fall

42

Brain Pathology ISSN 1015-6305

MINI SYMPOSIUM Forensic Pathology of Brain Trauma in Children

Accidental Traumatic Head Injury in Infants and Young Children

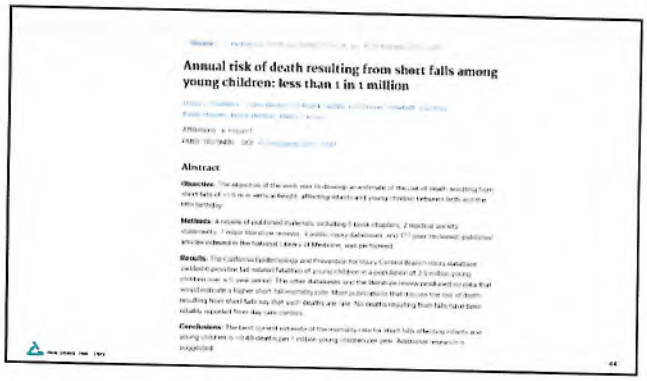
Mary E. Case, MD

Keywords

Corresponding author

Abstract

43



Annual risk of death resulting from short falls among young children: less than 1 in 1 million

Abstract

Objective: ...

Methods: ...

Results: ...

Conclusions: ...

Pathology of Domestic Short Falls

- Focal contact injury can occur when <6 feet (contusion, scalp laceration) vs no injury (majority cases)
- Skull fracture
  - only 1% to 3% of short falls in young children
  - generally simple linear skull fracture *(without associated intracranial hemorrhage or neurological deficit)*
  - associated focal EDH or SDH (more rarely) in 1% of skull fractures
- No diffuse brain injury *(too short contact time on impact)*
- No traumatic DAI
- Rarely cause fatal HI but has the potential to do so

Skull Fractures in Short Falls

Consistent	Inconsistent
• Simple, linear, non-displaced	• Complex, extensive/large
• Do not cross suture lines	• Involve several skull bones
• No associated neurological deficits	• Edge separation >3mm
• No major non-head trauma	• Severe intracranial pathology
	• Brain contusion/laceration
• Can have fatality from cerebral injury without skull fracture or external head injury	• Interhemispheric SDH
	• DAI
• Not evidence of NAI in isolation	• Retinal hemorrhage
• Greatest incidence in <1 yr olds	• + Major non-head injury
	• Abuse must be investigated unless hx of major fall or road accident provided

Bilateral Skull Fractures

- May result from accidental or abusive mechanisms,
  - double-impact
  - compression of the head between two surfaces,
  - single impact onto the calvarial vertex or occiput.
- Suspicious for abuse,
- Accessory sutures may mimic fracture radiologically, *esp. if fracture lines appear symmetric*

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Bilateral Parietal Skull Fractures in Infants Attributable to Accidental Falls

Abstract

Keywords: Abuse, Accidental, Bilateral, Infant, Skull fracture

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Thank You.

(aewalker@eorla.ca)

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eorla.ca

Where Science and Innovation meet Compassionate Care

Tylenol-Cyanide Case

Edmund R Donoghue, MD
Professor
WMed Homer Stryker M.D. School of Medicine
Kalamazoo, MI
Formerly
Chief Medical Examiner, Cook County
Chicago, Illinois

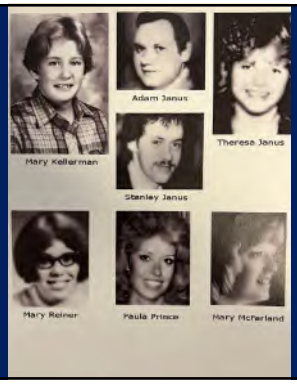
1

Tylenol-Cyanide Incident: Chemical Terrorism

- Occurred in Cook and DuPage Counties in Illinois
- Began in late September 1982
- Killed 7 people, 5 women and 2 men

2

Tylenol-Cyanide Victims



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Approach to Multiple Deaths

- In multiple deaths, search for a common denominator
- As a general rule, if two or more individuals are found dead or ill in a house or motor vehicle, the most likely cause of death is carbon monoxide intoxication
- After carbon monoxide has been excluded a search for other factors is in order

4

Poisons Causing Rapid Death

- Cyanide
- Nicotine

5

Use of Cyanide

- Laboratories
- Insecticides
- Metal polishing
- Electroplating
- Gold mining

6

Toxic Effects of Cyanide

- Blocks the action of the respiratory enzyme cytochrome oxidase
- Prevents the utilization of oxygen by cells

7

Odor of Cyanide

- Pungent bitter almond aroma
- A large portion of the population is incapable of smelling cyanide
- Characteristic is genetically inherited

8

Clinical Presentation of Cyanide Poisoning

- History of rapid incapacitation
- Cyanide may or may not be present at scene
- Bitter almond odor on breath
- Highly alkaline gastric contents
- Metabolic acidosis
- Elevated venous pO_2

9

Unsung Heroine

- Marge Gosch
  - Co-worked of Jeanna Kellerman at United Airlines
  - Mother-in-Law of Lt. Philip Capettelli of AHFD

10

Identification of Tylenol as the Vehicle

FF Richard Keyworth
EGVFD

Lt Philip Capettelli
AHFD

11

Identification of Tylenol as the Vehicle

Lt. Charles
Kramer, AHFD

Helen Jensen
RN

12

Toxicological Confirmation

Michael I. Schaeffer, PhD

13

Requests for Assistance

- When confronted with a serious problem
- Do not be afraid to request whatever help is necessary
- Regardless of the hour of the day or the day of the week

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Autopsy Finding: Cyanide Intoxication

- Red lividity
- Pungent bitter almond odor
- Intense hemorrhage and erosion of gastric mucosa
- Strongly alkaline pH in gastric contents

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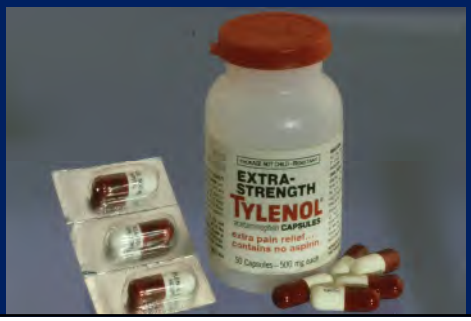
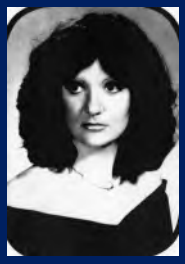
New Packaging



18

Diane Elsroth 23WF Yonkers, NY

- Died at boyfriend's parents home, Feb 8, 1986, after taking 2 Extra-Strength Tylenol capsules purchased at grocery store in Bronxville
- No suspects and few clues in the search for the tamperer.



19

SUSPECT

Roger Arnold

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21

John Stanisha

- Called the eighth Tylenol-Cyanide victim by some
- Shot by Roger Arnold because he thought Stanisha identified him to the Tylenol-Cyanide Task Force

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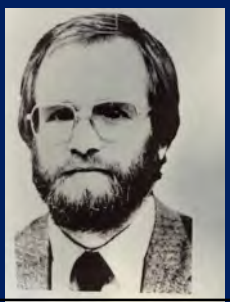
Suspect

James L. Lewis



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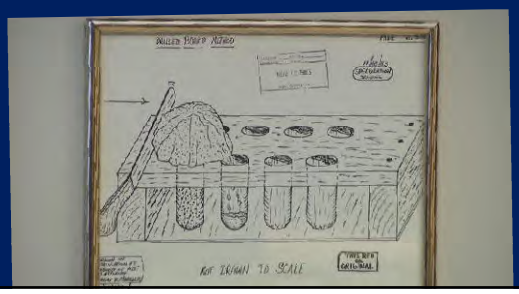
James L. Lewis' Drawing



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Summary

- The case remains unsolved
- 41st anniversary occurred, September 29, 2023
- Theories

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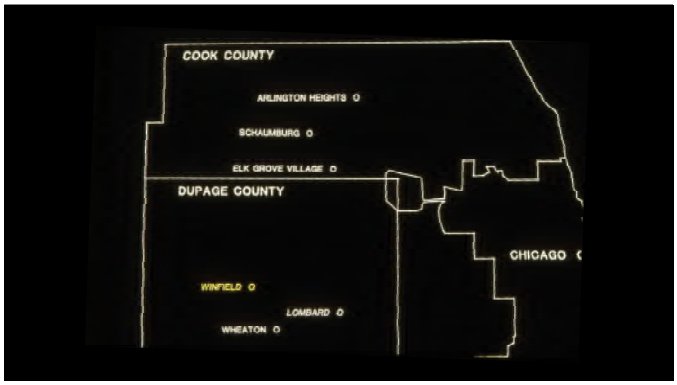

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Where Contaminated Bottles Were Found

MUNICIPALITY	POP. 1980	DISTINCTION
Chicago	3,005,000	Seat of Cook County
Arlington Heights	66,000	Arlington Park Racetrack
Schaumburg	53,000	Schaumburg Mall
Wheaton	43,000	Seat of DuPage Count
Lombard	37,000	Lilac Festival
Elk Grove Village	29,000	Headquarters United Airlines
Winfield	5,000	Central DuPage Community Hospital

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Tylenol-Cyanide Case

Edmund R Donoghue, MD
Professor
WMed Homer Stryker M.D. School of Medicine
Kalamazoo, MI
Formerly
Chief Medical Examiner, Cook County
Chicago, Illinois

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The Diverse World of Tetrahydrocannabinols and their Analogs, and Synthetic Cannabinoids

-A Presentation by the NAME Toxicology Committee-

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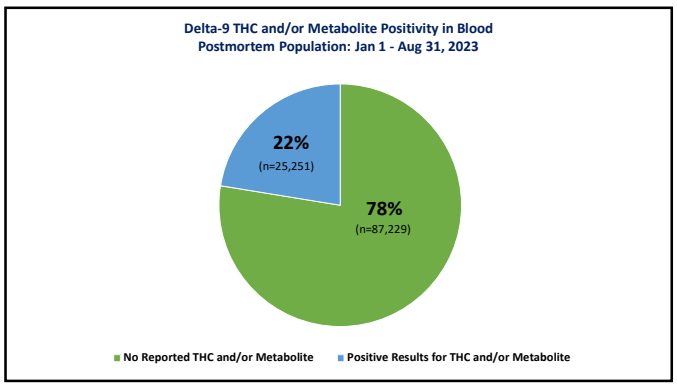

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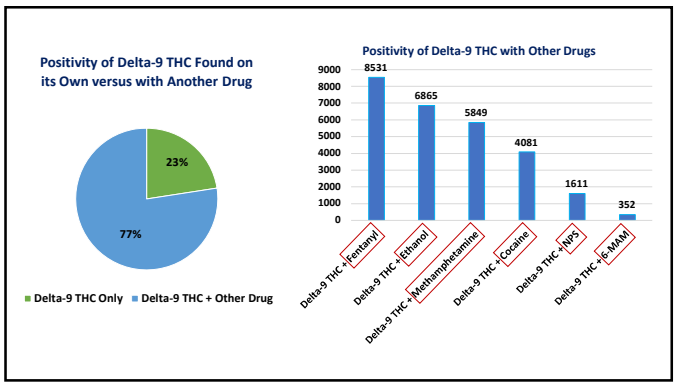

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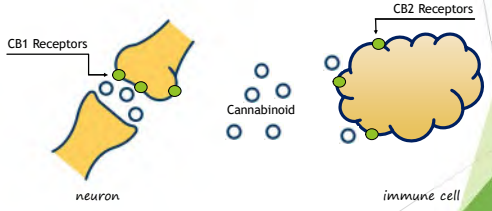
THE ENDOCANNABINOID SYSTEM (CB1 and CB2 RECEPTORS)



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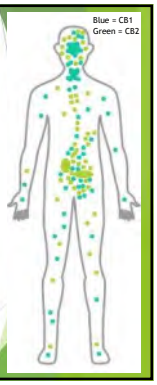
CB1 and CB2 RECEPTOR ACTIVATION – WHAT ARE THE EFFECTS?

CB1 primarily found in the brain and CNS	CB2 primarily found in the peripheral organs and cells associated with the immune system
Motor activity Thinking Motor coordination Appetite Short term memory Pain perception Immune cells	Spleen Liver Pancreas Colon Bones



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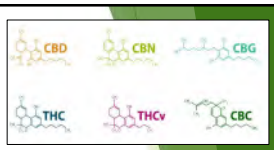
CANNABINOID CLASSES

phytocannabinoids



(+>100 others)

semi-synthetic cannabinoids

These maintain the chemical structure of THC with small chemical modifications to improve or refine its pharmacological profile. For example, you could synthesize CBD into other cannabinoids such as **delta-8 THC**, **delta-10 THC**, **Exo-THC**, and **hexahydrocannabinol**.

synthetics cannabinoids

These are man-made. These chemicals are called *cannabinoids* because they act on the CB1 and CB2 receptors.

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American Academy of Pediatrics

From: **Pediatric Edible Cannabis Exposures and Acute Toxicity: 2017–2021**

Pediatrics. 2023;151(2). doi:10.1542/peds.2022-057761

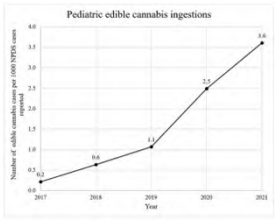

Figure Legend:

Pediatric edible cannabis product ingestions per 1000 pediatric calls to the National Poison Data System by year.

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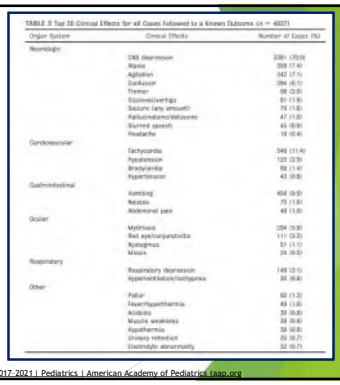
PEDIATRIC EDIBLE CANNABIS EXPOSURES

TOP 5 CLINICAL EFFECTS:

1. CNS Depression (70%)
2. Tachycardia (11.4%)
3. Vomiting (9.5%)
4. Ataxia (7.4%)
5. Agitation (7.1%)



Organ System	Clinical Effects	Number of Cases (%)
Neurologic		
	CNS depression	338+ (70.0)
	Ataxia	359 (7.4)
	Agitation	342 (7.1)
	Confusion	284 (5.7)
	Tremor	98 (2.0)
	Dizziness/vertigo	91 (1.9)
	Seizure (any amount)	79 (1.6)
	Hallucinations/delusions	47 (1.0)
	Slurred speech	45 (0.9)
	Headache	18 (0.4)
Cardiovascular		
	Tachycardia	548 (11.4)
	Hypotension	123 (2.5)
	Bradycardia	68 (1.4)
	Hypertension	43 (0.8)
Gastrointestinal		
	Vomiting	458 (9.5)
	Nausea	75 (1.5)
	Abdominal pain	48 (1.0)
Ocular		
	Mydriasis	284 (5.9)
	Red eye/conjunctivitis	111 (2.3)
	Nystagmus	51 (1.1)
	Miosis	24 (0.5)
Respiratory		
	Respiratory depression	148 (3.1)
	Hyperventilation/tachypnea	30 (0.6)
Other		
	Pallor	65 (1.3)
	Fever/hyperthermia	49 (1.0)
	Acidosis	39 (0.8)
	Muscle weakness	28 (0.6)
	Hypothermia	28 (0.6)
	Urinary retention	35 (0.7)
	Electrolyte abnormality	32 (0.7)

Pediatric Edible Cannabis Exposures and Acute Toxicity: 2017-2021 | Pediatrics | American Academy of Pediatrics (aap.org

8

CARDIOVASCULAR RISK

AMERICAN COLLEGE of CARDIOLOGY

Clinical Topics | Latest in Cardiology | Education and Me

Frequent Marijuana Use Linked to Heart Disease

Researchers caution that cannabis use is not without risk

Feb 26, 2020

J Am Coll Cardiol. Author manuscript; available in PMC 2021 Mar 19

Published in final edited form as:

J Am Coll Cardiol. 2020 Jan 28; 75(3): 320–332.

doi: 10.1016/j.jacc.2019.11.025

PMCID: PMC7971484

NIHMSID: NIHMS1677641

PMID: 31976877

Marijuana Use in Patients with Cardiovascular Disease: Current Knowledge and Gaps

Emilia M. DeFilippis, MD,[1] Navkaranbir S. Bajaj, MD MPH,[2] Amrita Singh, MD,[2] Rheet Mallow, PharmD,[3] Michael M. Givertz, MD,[3] Ron Blankstein, MD,[5] Deepak L. Bhatt, MD MPH,[3] and Muthiah Vaduganathan, MD MPH[2]

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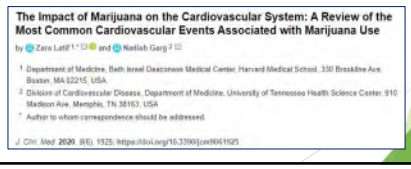

The Impact of Marijuana on the Cardiovascular System: A Review of the Most Common Cardiovascular Events Associated with Marijuana Use

by Zara Latif [1,*] and Nadish Garg [2]

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J. Clin. Med. 2020, 9(6), 1925; https://doi.org/10.3390/jcm9061925

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- Estimated >2 million US adults who reported ever using marijuana have cardiovascular disease.
- CB1 activation in cardiomyocytes, vascular endothelial cells, and smooth muscle cells may lead to oxidative stress, inflammation, fibrosis, vasodilation, and negative inotropy.
- Observational studies have suggested an association between marijuana and a range of cardiovascular risks.
- Few randomized clinical trials have been conducted or are planned to explore the effects of marijuana on cardiovascular risk.
- Screening and testing for use of marijuana are encouraged in clinical settings, especially in care of young patients presenting with cardiovascular disease.

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Comparison of cyclic vomiting syndrome in adults and cannabis hyperemesis syndrome

	Cyclical Vomiting	Cannabis Hyperemesis Syndrome
Age at diagnosis (y)	34.8	29.3
Delay in diagnosis (y)	7.9	3.1
Duration of episodes (days)	3.8	N/A
Cannabis use	Occasionally	Universal
Triggering factors (e.g. infections, psychological stress, etc)	Frequent	Absent
Prodrome	Common	Common
Clinical findings		
Vomiting	Universal	Universal
Abdominal Pain	Common (58–73%) – Moderate to severe	Common – Mild to moderate
Compulsive Bathing	Absent	Universal
GES	Accelerated	Delayed
Comorbidities: Psychiatric	Common	Not common
Migraine headache	Common (24–70%)	Not common
Treatment	Abortive measures (antimigraine agents), supportive care, psychological support	Cannabis cessation, supportive care
Prophylaxis	Avoid triggers, TCA	Cannabis cessation

Data from Abell TL et al, Allen J et al and Soriano JM et al.

N/A: Not available, GES: Gastric emptying study, TCA: Tricyclic antidepressants

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AJG The American Journal of GASTROENTEROLOGY

ABSTRACTS: ACCEPTED: CLINICAL VIGNETTES/CASE REPORTS – SMALL INTESTINE/UNCLASSIFIED

Cases of Death Secondary to Cannabinoid Hyperemesis Syndrome

2217

Sobia, Kaarik MD[1]; Lee, Ye-Jin MD[1]; Schouweiler, Katie MD[2]; Keeney, Matthew MD[2]; Nackeeb, Marcus MD[2]; Hsin, Adrian DO[1]

First case: A 41 yo male with a 20-yr history of frequent marijuana use was found dead in his home. For 10 years, he had recurrent, prolonged episodes of nausea, vomiting and abdominal pain. He underwent an extensive GI evaluation including colonoscopy, upper endoscopy, abdominal CT, celiac serology, 24 hr urine porphyrins, and stool ovum/parasites; all testing was unremarkable. 8 months prior to death, he was hospitalized for severe hyponatremic dehydration. 5 days prior to death, he developed intractable nausea, vomiting and weakness; he did not seek medical care. Autopsy showed evidence of dehydration, acute esophageal necrosis with black discoloration of the distal esophagus, focal right lower lobe pneumonia. Vitreous chemistry showed a pattern of hyponatremic dehydration (Na 134 mmol/L, Cl 78 mmol/L, BUN 88 mg/dL and Cr 2.8 mg/dL). Toxicology showed only marijuana (THC) and marijuana metabolite (THC-COOH) in blood and THC-COOH in urine. The cause of death was hyponatremic dehydration due to exacerbation of CHS.

VIT CHEM: Hyponatremic dehydration
COD: hyponatremic dehydration due to exacerbation of CHS

Second case: A 48 yo male with a history of fibromyalgia, anxiety, depression, prior diagnosis of somatization disorder and episodes of intractable nausea and vomiting was found in his bathtub after a neighbor reported continuous running water for 2 days. Autopsy revealed evidence of dehydration, acute esophageal necrosis and focal early pneumonia in the right lung likely from aspiration. Vitreous chemistry showed severe hyponatremic dehydration. Toxicology revealed THC, THC-COOH, 7-amino-clonazepam (clonazepam metabolite) and pregabalin. The cause of death was hyponatremic dehydration in the setting of probable CHS.

VIT CHEM: Severe hyponatremic dehydration
COD: hyponatremic dehydration in the setting of probable CHS

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POSTMORTEM CONSIDERATIONS

THC is highly lipophilic with a large volume of distribution.

With higher doses and long-term use, substantial amounts of THC and its metabolites accumulate in deep body stores. After death, these stores are slowly released.

These characteristics mean that postmortem redistribution will occur.

Cannabinoid concentrations measured postmortem should not be considered identical to or representative of antemortem circulating concentrations.

PK studies on living individuals, which used formulas for predicting time of use relative to sample collection, should not be applied to samples collected postmortem.

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SYNTHETIC CANNABINOIDS

- Bind to the same receptors as THC.
- *In vitro* studies have shown that some synthetic compounds bind more strongly to this receptor than THC as measured by the inhibitory (affinity) constant K_i.

K_i represents the concentration of drug required to occupy 50% of the receptors.
The LOWER the Ki for a particular drug at a particular receptor, the STRONGER its binding affinity for that receptor.
This is because the lower K_i means that the drug can occupy 50% of those receptors even when the drug is present in a lower concentration.

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Symptoms	Type of effect[+]	Type of drug	
		Synthetic Cannabinoids	Cannabis
Neuropsychiatric	Acute	Severe psychotic symptoms including; agitation (28), aggression, catatonia, paranoia, auditory and visual hallucinations, perceptual alterations, and persistent psychosis episode (10, 14, 29).	Perceptual alterations including; hallucinations and distortion of spatial perception are typical effects (7, 30). Paranoia, aggressiveness, and prolonged psychosis were observed in vulnerable users and are dose-related (1, 2, 7).
	Long-term	Chronic use may increase the risk for developing psychotic disorders (15, 27, 31).	An increased risk of psychotic disorders in vulnerable individuals and naïve users (2, 25, 27, 32).
Affect	Acute	Negative mood, panic attacks, manic behavior (10), depression (16), and suicidal ideation (10, 33).	Anxiety and panic attacks; especially in naïve users (1).
	Long-term	Depression (16), irritability and persistent anxiety (29, 33).	An increased risk for developing anxiety (34, 35), and mood disorders (1, 35, 37).
Cognitive	Acute	Severe cognitive impairments including; memory attention, attention difficulties, and amnesia (13, 33).	Wide range of dose-related cognitive deficits including; attention, working-memory, cognitive inhibition, and psychomotor function (38–41).
	Long-term	Executive function deficits of working memory and attention (16)	Impairments of set-shifting, verbal learning, attention, short-term memory and psychomotor functions (39, 42).
Cardiovascular	Acute	Tachycardia, hypertension, myocardial infarction, arrhythmias, chest pain, and palpitations (13, 43).	An increase of cardiovascular activity, increase heart rate, and decrease blood pressure (40, 44).
	Long-term	Prolong use may increase risk of cardiovascular disease (44, 45).	An increased risk of cardiovascular disease after prolong use (1, 44, 46).
Neurologic	Acute	Dizziness, somnolence, seizures, hypertonicity, hyperflexion, hyperextension, sensation changes, and fasciculations (10, 14, 29).	Dizziness, somnolence, and muscle tension (38, 40).
	Long-term	Preliminary evidence for structural and functional central nervous system alterations (47, 48).	Structural and functional abnormalities in a range of brain areas including the hippocampus and amygdala (49, 50).
Gastrointestinal	Acute	Nausea, emesis, and appetite change (10, 14, 29, 29).	Hyperemesis and increase appetite (1, 7, 30).
	Long-term	Severe weight loss after prolong use (10, 13).	Low body weight among regular users (51).
Other	Acute	Acute kidney injury, abdominal pain, miosis, mydriasis, conjunctival hyperhemia, fatigue, rhabdomyolysis, cough (11, 13, 43), deficits of driving ability (52–54).	Bronchodilation (55), impairments of driving ability (1, 7).
	Long-term	Kidney diseases, insomnia, nightmare, dependency, tolerance, and withdrawal (11, 13, 43).	An increased risk of obstructive lung disease including lung-cancer (1, 7, 56), an increased risk of cancers of the oral cavity, pharynx and esophagus (56), cannabis addiction, tolerance, and withdrawal (1, 7).

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QUESTIONS

- Should cannabinoid testing be performed for:
  - All postmortem cases
  - Select cases only
- If cannabinoid testing is performed, should results be:
  - Qualitative
  - Quantitative
  - Or is it case and matrix specific

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POINTS TO REMEMBER

- The lack of safety standards, accuracy in labeling, and quality control in terms of delta-9-THC content in edibles leads to additional concerns for unintended intoxication, particularly among children.
- There are also an increasing number of psychoactive isomers of delta-9-THC creating a confusing unregulated market, including delta-8-THC, delta-10-THC, Exo-THC and hexahydrocannabinol and others, that while psychoactive will not show up by routine toxicological tests or may be erroneously reported as delta-9-THC.
- As the potency of these products rise, their association with cardiovascular-related deaths has increasingly been questioned. Additional associated health risks include the earlier onset of psychotic disorders for those already at risk, respiratory detriments, and vaping-related lung injuries.
- Illegal synthetic cannabinoids (SCs) present more significant risks and are associated with more frequent severe effects including delirium, agitation, psychosis, tachycardia, arrythmia, and respiratory depressant effects.

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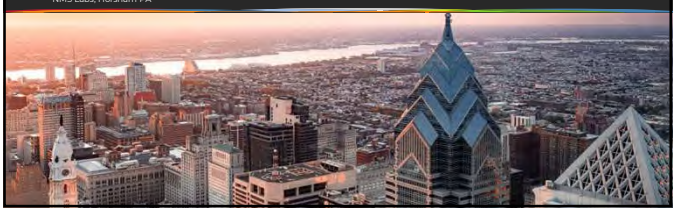
Appropriate Consideration and Interpretation of Xylazine in Deaths Involving Fentanyl

NAME, San Jose, October 2023

Barry K Logan, Sherri L Kacinko, MJ Menendez, Alex Krotulski, Joshua DeBord, Laura Labay*

Center for Forensic Science Research and Education, Fredric Rieders Family Foundation, Willow Grove, PA

NMS Labs, Horsham PA



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cfsre | NPS DISCOVERY

▪ Disclosure

- Dr Laura Labay is a Fellow at CFSRE, and Principal Toxicologist at NMS Labs.
- Dr Barry Logan is President and Founder of the Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation (FRFF) and is Senior Vice President and Chief Scientist at NMS Labs.
- NMS Labs is a commercial provider of forensic toxicology and chemistry laboratory services, and this presentation will mention data from both NMS Labs and the CFSRE

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Cutting Agents and Adulterants

- **Cutting agents/Diluents:**
  - Inert fillers added to drug to add bulk.
  - Make the substance easier to measure, distribute and use.
  - Add uncertainty as to the actual dose of drug being ingested.
  - *Examples: mannitol, sorbitol, galactose, dextrose, MCC, starch, cornflour, carbonates, powdered milk, dimethylsulphone (DMS) and others.*

- **Adulterants:**
  - Pharmacologically active, non-scheduled drugs added to drug to add bulk or for **contributory effect.**
  - Increase the risk of adverse side effects and drug interactions.
  - *Examples: other illicit drugs (e.g. fentanyl and analogs, nitazenes), acetaminophen, brodifacoum, quinine, caffeine, theophylline, guaifenesin, dextromethorphan, phenacetin, metamizole, quetiapine, aminopyrine, benzocaine, lidocaine, procaine, tramadol, diphenhydramine, hydroxyzine, diltiazem, medetomidine, levamisole, phenylbutazone, acepromazine, pentobarbital, xylazine…*

3

3

Xylazine as an Adulterant

- Synthesized in Germany in 1982 by Bayer
- Not scheduled in the United States*
- Identified in injecting drug users in Puerto Rico since early 2000's
  - AKA *anestesia, anestesia de caballo,*
  - *Toruella et al, 2011*
- Concurrent intoxication with fentanyl and xylazine in Philadelphia in 2006
  - Wong et al, 2008
- Reported as a common adulterant in US heroin coming from South America in 2016
  - DEA, 2018
- Identified in heroin (4%) and fentanyl (11%) exhibits and 3% of cocaine exhibits from VT and KY in 2017
  - Fiorentin et al, 2018
- Widespread presence in fentanyl in Philadelphia and Northeastern States in 2023
  - AKA *Tranq, Tranq dope, zombie drug, sleep cut,*
  - *Adulteration happening later in the distribution chain*

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Xylazine as an Adulterant

(DEA) This undated photo provided by the Philadelphia Department of Public Health shows discarded boxes of xylazine seized in a raid.
https://www.cnn.com/2021/02/04/us/horse-tranquilizer-street-drug-trnd/index.html

https://filtermag.org/tranq-dope-the-heroin-combo-thats-been-putting-philly-to-sleep/

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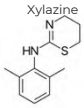
Xylazine - Pharmacology

- Alpha-2-adrenoceptor agonist (A2AA)
- Central anti-adrenergic drugs downregulate the sympathetic nervous system
- Non-opioid sedative, analgesic and muscle relaxant
  - Results in reduced heart rate, lower blood pressure, sedation
  - Not respiratory depressant, but blunts reflex response to hypoxia
  - Uncommonly bradycardia and hypotension
  - Other effects: Nausea, fatigue and gastric upset
- Other major drugs in this class:
  - Clonidine, **Dexmedetomidine**, Tizanidine, Tetrahydrozoline and Romifidine*
    - A2AA's are used in the emergency room to treat opioid withdrawal
    - Sometimes in combination with ketamine to avoid respiratory depression
    - Also used in treating nicotine, alcohol and opioid withdrawal
- Xylazine is not federally controlled in the US
  - Some states have recently moved to schedule it as a schedule I, II or III substance
- There is no antidote/antagonist to Xylazine

Xylazine



Clonidine
Catapres®

6

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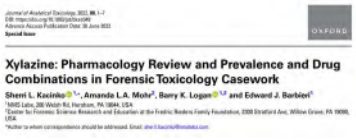
Xylazine Effects

- Effects and Adverse Effects
- Sedation
- Disorientation
- Drowsiness
- Slurred Speech
- Acidosis
- Slumped posture
- Muscle Relaxation
- Skin lesions
- *Bradycardia*
- *Hypotension*



Xylazine: Pharmacology Review and Prevalence and Drug Combinations in Forensic Toxicology Casework

Kacinko SK, Mohr ALA, Logan BK, Barbieri EJ. Xylazine: Pharmacology Review and Prevalence and Drug Combinations in Forensic Toxicology Casework. J Anal Toxicol. 2022 Jun 30:

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Xylazine Effects

- Effects and Adverse Effects
- Sedation
- Disorientation
- Drowsiness
- Slurred Speech
- Acidosis
- Slumped posture
- Muscle Relaxation
- Skin lesions
- *Bradycardia*
- *Hypotension*

- New York Post 2/21/2023

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Xylazine Effects

- 32-year-old male
- Reported a 3-year history of daily use of fentanyl adulterated with xylazine
- Injection sites: neck and arm veins
- 1 month history of enlarging chest wounds
- Osteomyelitis of the clavicles and manubrium with soft-tissue ulceration and inflammation.
- A tissue culture grew Pseudomonas aeruginosa and enterococcus species.
- Diagnosis: Xylazine-associated skin injury complicated by soft-tissue infection and osteomyelitis.

Xylazine-Associated Skin Injury

Publication: The New England Journal of Medicine
Publisher: Massachusetts Medical Society
Date: Jun 15, 2023

O'Neil J, Kovach S. Xylazine-Associated Skin Injury. N Engl J Med. 2023 Jun 15;388(24):2274.

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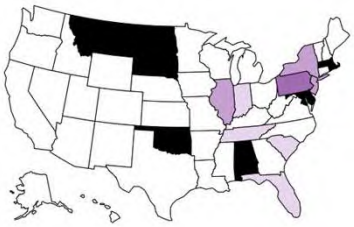
Geographic Positivity

Xylazine positivity Jan 2019



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NPS DISCOVERY – Drug checking - Philadelphia

Summary and Key Findings

- 801 samples analyzed Nov 1, 2020 - EOY 2022
- Most "Dope" samples contained xylazine as an adulterant (>90%)
- The average fentanyl purity was 13% (ranged from 1.09% to 53%), and was stable over 2022
- The average xylazine purity was 35% (ranged from 0.24% to 77%), and increased over 2022

https://www.cfsre.org/nps-discovery/drug-checking/drug-checking-q3-2022-philadelphia-pennsylvania-usa

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Xylazine – Quantitative Results

- 350,000 Cases screened between January 2019 and June 2023
- Presumptive positive increased from 0.8% - >4%
- Quantitative results from 9,400 cases

Case Type	N	Concentration (Mean ± SEM, ng/mL)	Median Concentration (ng/mL)	Concentration Range (ng/mL)
DUID	**279**	**45 ± 5**	**21**	**5.0 – 550**
MDI (with Outliers)	**9166**	**51 ± 5**	**17**	**5.0 – 35,000**
MDI (w/o Outliers; -8)	**9158**	**39 ± 1**	**17**	**5.0 – 3,100**

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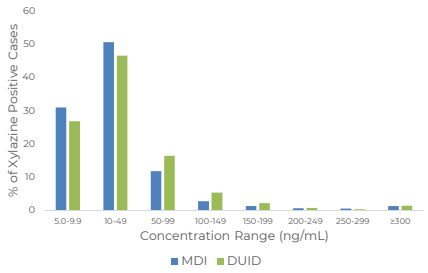
MDI vs DUID concentrations



- No "therapeutic" concentrations in humans
- In animals – 100 – 400 ng/mL for sedation
- No single drug fatalities less than 2,300 ng/mL
- DUID's as high as 550ng/mL
- Literature living subjects above 1,500ng/mL

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Xylazine - Drug Co-Positivity

Case Type	N	Concentration (Mean ± SEM, ng/mL)	Median Concentration (ng/mL)	Concentration Range (ng/mL)	Co-Positivity
DUID	137	36 ± 4	15	5.1 - 450	Opioids – 99% Stimulants - 60% Benzodiazepines – 36% Cannabinoids – 31% Gabapentin – 11% Antidepressants – 10% Antihistamines 9.5%
MDI	3079	41 ± 5	17	5.0 – 11,000	Opioids – 99% Naloxone – 31% Stimulants - 54% Benzodiazepines – 26% Cannabinoids – 30%

Kacinko et al, 2022

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Xylazine Interpretation

- Considerations
  - No Human PK/PD data available:
    - Dose to sedate 200Lb animal ~50mg, associated plasma concentrati 68 ± 15 ng/mL
  - Fentanyl glassines/wrappers currently being sold in US
    - ~ **30mg** total weight (13% fentanyl (**4mg**); 35% xylazine (**10mg**))
  - Almost complete overlap between DUID and Death case concentrations in fentanyl co-administration cases.
  - Mean concentrations in fentanyl positive postmortem cases with Xylazine present: 36-34 ng/mL
  - Literature values in deliberate xylazine ingestion suicide attempts by surviving subjects 1,500ng/mL, 4,600ng/mL
- **Conclusions**
  - **The mean concentration of xylazine in deceased and living individuals are similar and are much lower than what has been reported in known xylazine overdose cases which indicates xylazine toxicity likely does not play a significant role in fentanyl overdose cases.**

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Thank you! Questions?

www.CFSRE.org

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THE ROLE OF MIXED MARTIAL ARTS IN FORENSIC PATHOLOGY

GREGORY MCDONALD DO

MIXED MARTIAL ARTS

- Came to popularity in the US in the early 1990's when the Ultimate Fighting Championship (UFC) became the major mixed martial arts competition
- Prior to this most martial artists competed within their own disciplines and styles: boxer vs boxer, judoka vs judoka etc

MIXED MARTIAL ARTS

- Practitioners of various arts and disciplines from around the world competed
- Initially there were very few rules, no time limits and no weight classes
- Fights would only end with a knockout or submission

MIXED MARTIAL ARTS

- Men's and women's divisions
- The popularity of MMA has skyrocketed since it's inception in the early 1990's
- Increase in the number of schools teaching MMA

MIXED MARTIAL ARTS

- MMA has evolved into a significant mainstream international sport
- MMA uses strikes such as punches, elbows, kicks and knees
- MMA also uses grappling techniques such as sweeps, takedowns and **chokeholds**

MIXED MARTIAL ARTS

- More and more people are training as a form of exercise and self-defense
- Many LEOs and Corrections officers train
- With this popularity, the forensic pathologist needs to become familiar with this discipline since the techniques may indeed be used in **a "street fight," domestic violence incidents, or deaths in custody.**

MIXED MARTIAL ARTS(MMA) AND FORENSIC PATHOLOGY

- This can allow for a more specific criminal investigation resulting from a more detailed interview of the suspect, witnesses, and, in nonfatal events, the victim
- The success of these techniques can allow a smaller, more **gracile** person to dispatch a larger, more **robust** opponent thus increasing the pool of potential suspects

MIXED MARTIAL ARTS(MMA) AND FORENSIC PATHOLOGY

- The physical findings may be minimal even on a larger victim if the duration of the assault is short when a trained martial artist dispatches a larger opponent with a well-executed submission technique such as a **chokehold.**
- Techniques such as chokeholds may leave a **paucity of injuries**

CHALLENGES

- Identifying someone who has lost consciousness can be a significant challenge, especially for lay people.
- Victims of strangulation may appear conscious since their eyes are often open, and they may not "go limp."
- Issues can happen during an emotionally volatile street altercation

CHALLENGES

- This lack of recognition can lead to the chokehold being applied beyond the **safe threshold**, resulting in a bad outcome.
- If the chokehold is not released quickly after one loses consciousness, irreversible brain injury can result.
- **Subjective signs of cerebral ischemia** include tunnel vision, tinnitus, and lightheadedness

11 MANUAL STRANGULATION

- One or two hands can be used
- Difficult to determine which hand was used
- The attack may come from the front, the side, or from behind the victim
- **Sometimes the legs can be used to strangle**

FRONT TWO HAND CHOKE

- Both hands grabbing the anterior neck

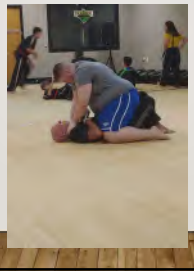
FRONT TWO HAND CHOKE

- Often have external neck injury: contusions from fingers and thumb may have fingernail abrasions

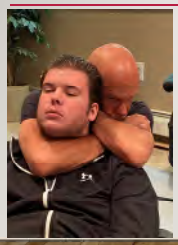
FRONT TWO HAND CHOKE

- **A trained Mixed martial artist is unlikely to use this rather primitive technique but would use a more efficient maneuver.**

15 DEFINITION OF STRESS!

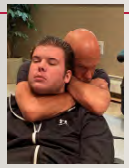


CHOKEHOLD AKA REAR NAKED CHOKEHOLD



- The right bicep occludes the right carotid, while the right forearm occludes the left carotid

CHOKEHOLD AKA REAR NAKED CHOKEHOLD

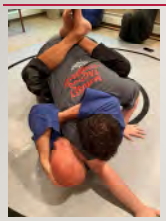


- Often, it does not leave significant external or internal neck injury.

"AIR CHOKE"

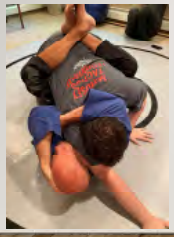
- The anterior neck is compressed
- Pressure is on the **larynx and NOT the carotids**
- It takes longer to produce unconsciousness
- May fracture the larynx

"ARM TRIANGLE"



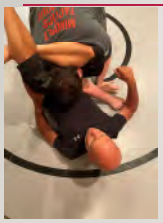
- Used when facing the victim
- The attacker is facing the opponent

"ARM TRIANGLE"



- The attacker's right bicep compresses the victim's left carotid, victim's right carotid is being compressed by their own right arm

"LEG TRIANGLE"

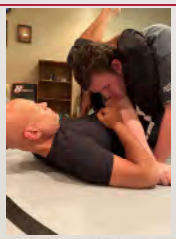


- The attacker's left leg compresses the victim's left carotid
- The right arm compresses the victim's right carotid

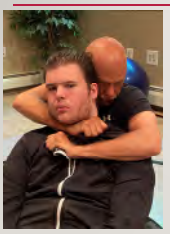
"LEG TRIANGLE"

- The attacker's legs form the shape of a triangle
- External neck injury may consist of abrasions from the attacker's pants

LEG TRIANGLE

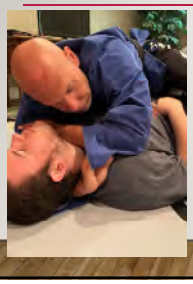


"COLLAR CHOKE"



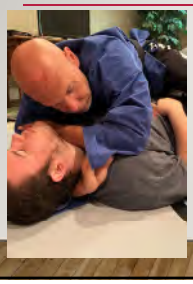
- The victim's collar is used as a type of ligature.
- The neck often has abrasions from the shirt collar or zipper and/or contusions from the perpetrator's hand

SLEEVE CHOKE



- The attacker faces their opponent
- The attacker grabs their own sleeve

SLEEVE CHOKE



- The neck is compressed by both arms while using the sleeve to gain leverage
- VERY EFFECTIVE

CLOTHING

- It is important to examine the victim's clothing and IF POSSIBLE, the alleged perpetrator's clothing
- Look for: tears or stretch marks in the clothing especially around the neck

CLOTHING

- Missing buttons or damaged zippers
- Is the clothing loose? Loose clothing tends to be easier to manipulate and can be used to strangle or throw the victim.
- Trace evidence: DNA from the perpetrator, dirt, gravel, and grass stains all may indicate a hand-to-hand struggle

VASCULAR INJURY ASSOCIATED WITH STRANGULATION

- **Carotid artery dissection**
- Occlusive **thrombus of middle cerebral artery with ischemic damage**
- **Vertebral artery dissection**

VASCULAR INJURY ASSOCIATED WITH STRANGULATION

- Various neurologic symptoms, including LOC, vertigo, hemiparesis, visual field loss, fine motor deficits, coma, death
- Symptoms may occur **immediately or days** after strangulation
- Death may occur after a **significant hospital stay**

CHOKEHOLDS, AKA VASCULAR NECK RESTRAINT(VNR)

- A well-executed chokehold can cause LOC in less than **10 seconds**
- The longer a chokehold is applied after LOC, the greater the likelihood of death or neurologic sequelae

CHOKEHOLDS AKA VASCULAR NECK RESTRAINT(VNR)

- After regaining consciousness, the person often does not remember the event.
- **Death** usually occurs after **3-4 minutes** of a continuously applied chokehold
- It is imperative to have a third party to monitor the chokehold to intervene and stop the bout or training session in a timely fashion

DELAYED COMPLICATIONS OF CHOKEHOLDS

- TIAs
- Strokes
- Carotid dissections

DELAYED COMPLICATIONS OF CHOKEHOLDS

- Disruption of atherosclerotic plaques leading to emboli
- May result in **delayed homicides**
- Important for the forensic pathologist/investigator to inquire about a **potential unnatural etiology** of TIAs and strokes

CONCLUSION

- More people are becoming familiar with chokeholds
- A great variety of chokeholds exist
- Chokeholds can be successfully executed by smaller gracile individuals
- Chokeholds can result in delayed complications including death

An Unusual Case Series of Mechanical Asphyxia

Christian Perez, MD
Kristy Waite, DO

NAME 2023 Annual Meeting

10/17/2023

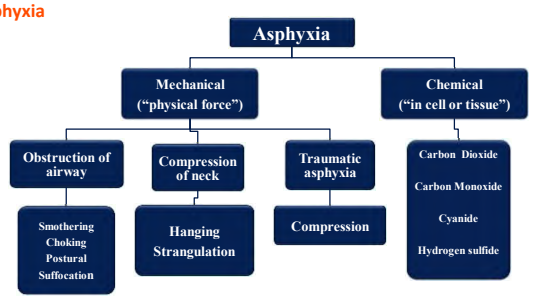
1

Outline

1. Asphyxia
   - Mechanical Asphyxia
2. Case #1
3. Case #2
4. Case #3
5. Case #4
6. Conclusion
7. References

2

Asphyxia



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Mechanical Asphyxia

1. Sub-category of obstruction of airway

2. Can be sub-classified in:
   - Traumatic – External compression that compromises ventilation (car falls on top of a person's chest)
   - Positional – Position of the body impedes breathing (baby gets wedged between bedrails)

4

Case #1

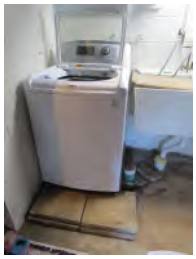
5

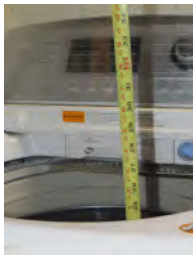
Scene

- 67 year-old white female
- Past medical history includes COPD, obesity, obstructive sleep apnea, hypertension, and hyperlipidemia
- Neighbor entered residence to check on her and found her upside down in her top-loading washing machine
- Emergency medical services was called and they pronounced her on scene
- There were no signs of external trauma

6

Scene





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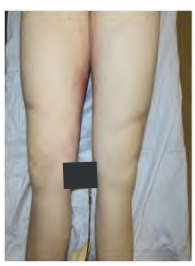
Toxicology

- Blood screen was positive for pregabalin
- Urine screen was positive for THC

8

Autopsy

- External: Patterned abrasions on bilateral lower extremities.
- Internal:
  - Cardiomegaly with biventricular dilatation
  - Bilateral lungs with moderate congestion

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10

Cause and Manner of Death

- Cause: Positional Asphyxia
  - Contributory factors: Chronic obstructive pulmonary disorder requiring supplemental oxygen
- Manner: Accident

11 10/17/23

11

Mechanism of death

- Failure of the inspiratory movements of the inspiratory muscles and the diaphragm
- Respiratory fatigue due to increased energy demand.
  - Increase in hydrostatic pressure in the upper body without compensatory mechanism
  - Pooling of blood and decreased flow of venous blood to right ventricle, resulting in hypovolemic shock

12 10/17/23

12

Case #2

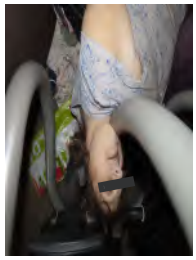
13

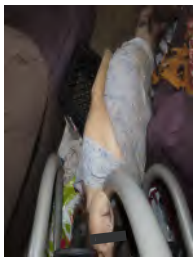
Scene

- 63-year-old white female
- Past medical history includes osteoarthritis, debility, and morbid obesity
- Found dead at her home after an unwitnessed fall
- Head and neck wedged in between exercise machine
- Paramedics responded and pronounced her on the scene

14

Scene





15

Toxicology

- Negative

16

Autopsy

- External – Blanched livor mortis with impression along the angle of the right jaw
- Internal – cholelithiasis, nephrosclerosis, and multiple leiomyomas

17

Cause and Manner of Death

- Cause: Positional asphyxia
  - Contributory factors:
    - Morbid obesity
    - Chronic debility
- Manner: Accident

18

Mechanism of Death

- Respiratory fatigue due to increased energy demand
- Compression of larynx and cervical vasculature causing hypoxemia

19

Case #3

20

Scene

- 39-year-old white male
- Pilot that arrived previous day from flight
- Drank heavily that night and left hotel
- Arrested for disorderly conduct, wandering around neighboring gas station, and was taken back to hotel around 1:00 am
- Co-pilot took him to his room and stayed with him for 30 minutes

21

Scene

- Co-pilot was not able to find him in the morning
- Hotel staff had seen the decedent in an extreme state of intoxication earlier in the morning
- The decedent was found at around 11:00 am in a laundry chute by hotel staff

22

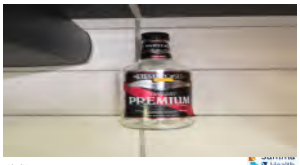
Scene



23

Scene

- There was an empty bottle of vodka and several medications in his room

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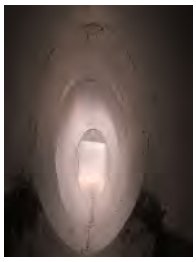
Scene





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Toxicology

- Blood: 0.06% of Ethanol
- Urine: Zolpidem (Ambien) present
- There is an increasing trend in drug use among pilots
  - The most commonly identified drug category is sedative antihistamines
- BAC of 0.04 mg/dL excludes from acting as crew member
- Both substances are CNS depressors that act on GABA receptors
- Zolpidem should never be taken with alcohol
- At least 24 hours after using zolpidem to consume alcohol
- Effects include:
  - Dizziness
  - Light headedness
  - Sleep walking
  - Incoordination

26

Autopsy

- External
  - Scattered superficial abrasions and contusions
  - Patterned abrasions on the back
- Internal: Cardiomegaly


27

Cause and Manner of Death

- Cause: Positional and traumatic asphyxia
  - Contributory factors: Mixed intoxication by alcohol and zolpidem
- Manner: Accident

28

Mechanism of Death

- Alcohol and zolpidem:
  - CNS depressants that reduce coordination and respiratory ability
- Positional Asphyxia:
  - Inhibition of respiratory muscles and diaphragm becoming unable to breathe
- Traumatic asphyxia:
  - Inhibition of respiratory movements and decrease of venous reflow to right ventricle

29

Case #4

30

Scene

- 54-year-old black male
- Past medical history includes hypertension and past cerebrovascular accident
- Found by brother in their home's workout room with a 250 lbs barbell resting on his anterior neck

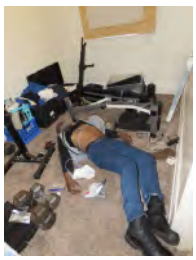
31

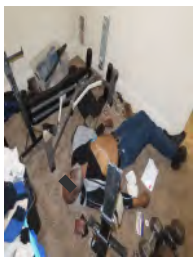
Scene

- Brother removed barbell from decedent's neck and placed decedent on floor.
- Fire department arrived and pronounced on the scene

32

Scene





33

Toxicology

- Negative

34

Autopsy

- External:
  - Petechial hemorrhages of sclerae and conjunctivae
  - Faint abrasion on anterior neck
- Internal:
  - Cardiomegaly
  - Fracture of superior horns of thyroid cartilage
  - Focal contusion of lower sternocleidomastoid muscles

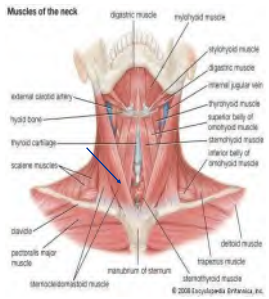
35

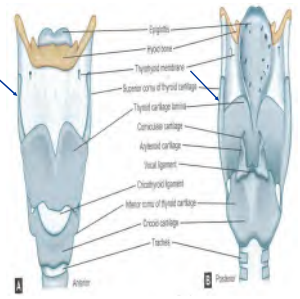
Petechiae

36

Scene

37





38

Cause and Manner of Death

- Cause: Traumatic compression of neck
- Manner: Accident

39

Mechanism of Death

- Narrowing of airways resulting in hypoventilation
- Compression of cervical vasculature resulting in cerebral ischemia
- 4.4 pounds to compress jugular veins
- 6.6 pounds to fracture superior horns of thyroid cartilage
- 11 pounds to compress carotid arteries
- 33 pounds to compress larynx/trachea

40

Conclusion

- Asphyxia-related deaths are not rare, however, their varied nature requires a thorough approach
- Mechanical asphyxia is mostly accidental, however there are circumstances in which it can be homicidal or suicidal
- Proper investigation is critical for the elucidation of these cases
- Cases involving commercial products may have to be reported to the U.S consumer product safety commission (CPSC) using the medical examiners and coroners alert project (MECAP)

41

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- Madea, B., & Schmidt, P. (2020). Positional Traumatic and Restraint Asphyxia. In *Asphyxiation, Suffocation, and Neck Pressure Deaths* (pp. 232–239). CRC Press.
- Spitz, W., & Diaz, F. (Eds.). (2020). Asphyxia. In *Spitz and Fisher's Medicolegal Investigation of Death* (5th ed., pp. 405–465). Charles C Thomas Publisher LTD.

42

43

PREVENTION OF DROWNING DEATHS IN MAUI HAWAII?

Matrina Schmidt, MD
Dist.18 Medical Examiner - Brevard County, FL

1

Oahu (Honolulu) is a Medical Examiner system

Hawaii (Big Island), Maui and Kauai Counties are a coroner system

The Chief of Police is the coroner for these 3 counties

The state contracts with outside agencies to provide autopsy services

Clinical Labs of Hawaii holds the contracts for these 3 counties

2

CLINICAL LABS OF HAWAII

- Medical laboratory testing company offering a full range of clinical, anatomical and drug tests in Hawaii
- 4 board certified forensic pathologists
- FP's follow NAME standards

3

Retrospective Study January 2011 to December 2022

- There were 282 drowning deaths on the island of Maui

4

DROWNING

- Washerwoman skin of the hands and the feet
- Fluid in the sphenoid sinuses
- Decedent found or recovered submerged

5

NEAR DROWNING

- Greater than 24 hours survival
- Symptoms after submersion in water

6

PARAMETERS OF THE STUDY

- Sex
- Contributory conditions
- Heart disease
- Activity in the water
- Toxicology
- Residence – state or country

7

PARAMETERS OF THE STUDY

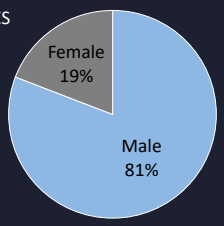
Swimming ability was not on the list

- Medical death investigation versus police investigation/coroner investigation
- Investigation on the mainland a decedent's ability in the water was always questioned

8

SEX OF THE DECEDENT

- 228 OF THE 282 DECEDENTS WERE MALES



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CONTRIBUTORY CONDITIONS

Condition	Cases	Percentage
Heart Disease	77	27.3%
Drowning	23	8.2%
Blunt Force Injuries	18	6.4%
Drugs	13	4.6%
Other Conditions	5	1.8%
Alcohol	3	1.1%
Epilepsy	3	1.1%

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Heart Disease

- Heart disease in 77 (27.3%) cases was contributory to death
- Heart disease was present in 140 (49.6%) cases (contributory or noncontributory)

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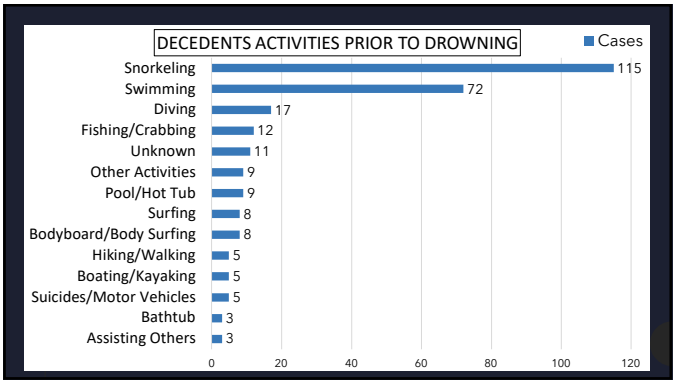

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Snorkeling

- 115 decedents were snorkeling
- 74 (64.3%) of the 115 snorkeling cases had heart disease

13

SNORKELING

- Snorkeling can increase the workload on the heart
  - Exertion of swimming
  - Breathing through snorkel tube
  - Subsequent panic due to decreased oxygen

14

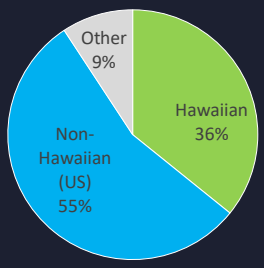
TOXICOLOGY RESULTS

Toxicology	Cases
Caffeine	175
Prescription Drugs	48
Alcohol	47
Illicit Drugs	28
No Substances Detected	16

15

RESIDENCY

- Hawaii residents – 101 cases
- Non-Hawaiian (US) – 155 cases
- Other countries – 26 cases



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STUDY FINDINGS

Findings were consistent with the known fact – drownings are more common in males

17

Study Findings

- People with heart disease should proceed with caution when considering snorkeling

Or

- People with heart disease should not snorkel

18

STUDY FINDINGS

- Drowning deaths
  - Hawaiian residents - 101 cases (36%)
  - Non-Hawaiian residents -181 cases (64%)

19

20

REFERENCES

- Drowning World Health Organization https://www.who.int/news-room/fact-sheets/detail/drowning
- Drowning Pervention Centers for Disease Control and Prevention, National Center for Injury Prevention and Control https://www.cdc.gov/drowning/facts/index.html
- Maui Map, Regions and Towns | All About Maui Travel Blog (mauiaccommodations.com)
- Meanings of the Island Names | The Polynesian Hostel Beach Club (wordpress.com)

21

A year of mass fatalities:

Identification issues, Logistics, Death certification, Lessons learned, and Wellness

Katherine Maloney MD, Janinne Blank RN MBA, Alexandra Hart MD, Stacey Reed DO, Sara Ohanessian MD, Tara Mahar MD

Erie County Medical Examiner's Office
Buffalo, NY

Mass fatality

- When there are more bodies than can be handled using local resources
- An incident resulting in the fatalities of not fewer than 3 individuals at 1 or more locations close to one another with a common cause
  - 34 U.S. Code § 10281

2022

- **May 14: Mass shooting**
- October 6: Homicide (3), Suicide
- October 24: MVC with 5 teenagers
- **December 24-28: Blizzard**
- December 31: House fire with 6 children

The mass shooting

May 14, 2022

- 10 people were shot at a grocery store with an AR-15

Issues: Politics

- Feedback from the county executive about how quickly the bodies were removed from the scene
- Feedback from the governor about the speed of identifications
- Suggestions about where certain personnel should be at certain times

Issues: Identification

- J. Doe 1 through 10
- Within a few hours presumptive identifications
  - Cars in parking lot
  - Wallets, licenses
- Pressure to have the identifications complete before the bodies arrived to the office

Solutions

- Police did family notifications based on the presumptive identifications
- Identification examinations
- Chief excels at BIFF method

Brief, Informative, Friendly, Firm

Identification examinations

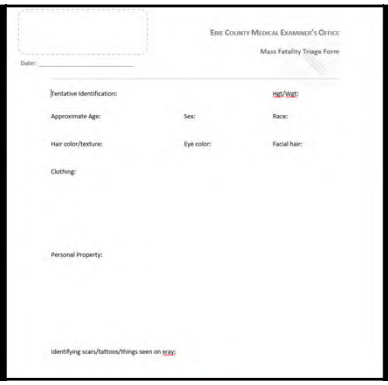
- Three medical examiners – One touching the body, one taking notes, one taking pictures and putting info into the computer
- Radiographs looking for hardware and identifiable features
- Clothing and personal property documented
- Physical features, scars, tattoos, etc. documented
- Fingerprints
- Dental charting

Triage

1. X-rays
2. Picture of ankle tag
3. One picture of each side of body and over the top
4. Face shot
5. Pictures of hands
6. Fingernail clippings
7. Fingerprints
8. Document clothing
9. Look for property/identification
10. Look for obvious tattoos/scars

People

1. Camera/evidence person – logged into LabLynx, Veripic, LODOX, HealtheLink
2. Writing person – property, clothing
3. Handling body person – fingernails, face clean
4. BPD evidence – fingerprints
5. Dr. Miller – dental



ERIE COUNTY MEDICAL EXAMINER'S OFFICE

Mass Fatality Triage Form

Date: _____

Tentative Identification: Ht/Wgt:

Approximate Age: Sex: Race:

Hair color/texture: Eye color: Facial hair:

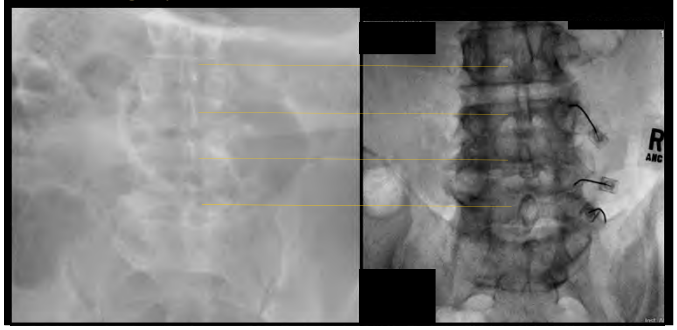
Clothing:

Personal Property:

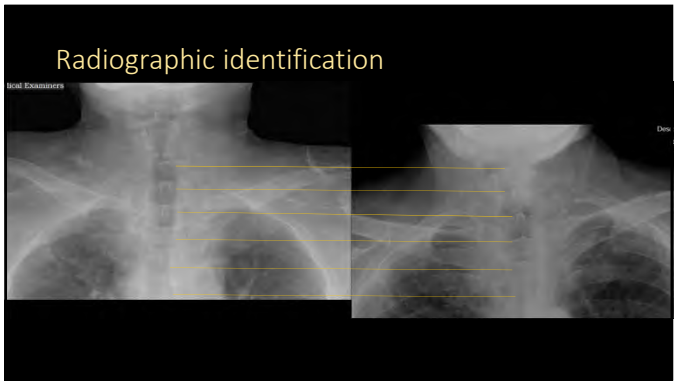
Identifying scars/tattoos/things seen on xray:

Radiographic identification

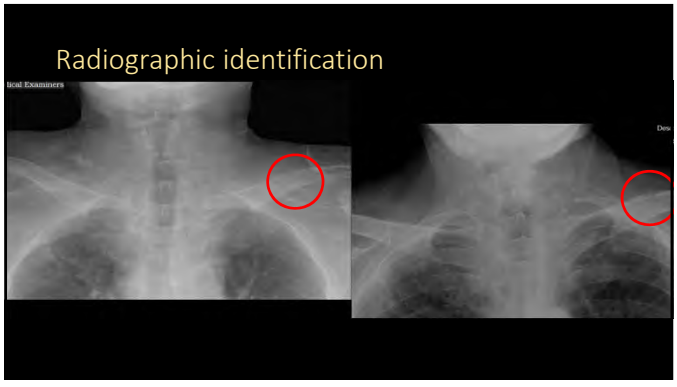
Radiographic identification



Radiographic identification



Radiographic identification



Death Certification

Recommendations for ME/C Offices

- Describe the disaster by name on the death certificate when possible.
- If the disaster does not have a formal name, provide the date and disaster type on the death certificate.

Death certification

- Supermarket mass shooting Buffalo New York May 2022

The blizzard

December 24-28, 2023

- 30 people died as a direct result of a blizzard and 15 (or maybe 30) additional people died as an indirect result of a blizzard

Issues: Logistics

- Christmas
- Roads completely impassable for several days
- Office closed – personnel working from home
- Hospital morgues filling up because funeral homes unable to do routine pick-ups
- Full scene investigation not possible in every case
- Every case required a full autopsy

Issues: Identification

- Many decedents found outside without identification (Doe)
- Those with names were pretty much all presumptive identifications (wallets, licenses)

Issues: Politics

- Pressure to certify cases as due to the storm or not as soon as the autopsy was completed
- Administrative staff from the county executive's office visiting, staying on site, asking questions, giving their input about the cause and manner of death
- Pressure to not associate indirect deaths with the storm
  - e.g. ambulance delays

Solutions: Luck

- Office under construction so double cooler spots (50 instead of 24)
- Many of the John and Jane Doe's had fingerprints on file

Solutions: Help from friends

- Two hospitals agreed to temporarily store our cases and delayed sending in cases (for about 48 hours)
- Police and National Guard assisted with scene investigations
- Sheriff's office picked up staff and drove them to work
- Refrigerated trucks obtained from Albany
  - Initially manned by the National Guard
- Four investigators donated from local medical examiner offices
  - Two remote cooler management, two autopsy assistance

Death certification

- Western New York blizzard December 2022

Wellness

Issues

- No resources or support provided by the county
  - Single email sent to everyone in the county to contact EAP
- We lost two of our best investigators after the storm

Solutions

- SPCA Paws for Love
- Link sent for therapists that accept our insurance
- Gift certificates for massage therapy
- Essential oils
- Stress balls
- Individual thank you notes
- Food, so much food

Lessons learned

- Most of the difficulties were political
  - Helping people understand what our office actually does
  - Managing expectations
- It is important to have friends, good relationships with outside agencies
- It is important to have good people in charge

Questions?

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THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Retrospective Review of Patients with Drug-Related Deaths in Jefferson County

J. Thompson Butler., Abby Chapman., Michael P.A. Williams., Caitlin Clevenger., Karen Cropsey., Li Li., Brandi McCleskey

No Conflicts of Interest

1

Introduction

- According to the National Association of Medical Examiner's (NAME) Manner of Death (MOD) Guide, when a person's death directly results from the acute toxic effects of a drug or poison, their manner of death is classified as an accident under the assumption that there was no intent to self-harm or commit suicide.

2

Introduction

- Determining MOD relies on contextual information allowing room for error if critical information is deemed unimportant by the medical examiner or is missing all together.
- Having limited or no access to a decedent's medical record can lead to a higher rate of error in manner of death determination.
- Correctly determining if a drug related death is an accident or a suicide is critical for efforts involving public health initiatives.

3

Methods

- The case management database of the Jefferson County Coroner/Medical Examiner's Office (JCCMEO) was queried for deaths caused by or with contributing factors of drug toxicity.
- If decedents were seen at UAB prior to their death, they were matched to their MRN for further study.
- Further study included MOD, whether decedents had been seen in the emergency room (ED) or by psychiatry (psych), when they were seen from time of death, chief complaint at most recent encounter, and their disposition following their most recent encounter.

4

Results

- Of deaths caused by or with contributing factors of drug toxicity, 98% were ruled accidental (Figure 1).
- 72% of deaths caused by or with contributing factors of drug toxicity had a documented encounter at UAB.

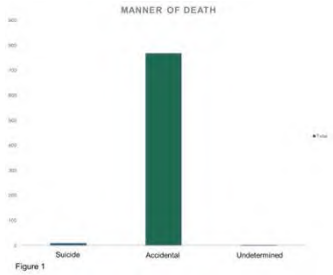

Figure 1

5

Results

- Of the decedents that had MRNs, 455 (58.66%) were seen in the ED, and 10 (1.3%) were seen by psychology (Figure 2).

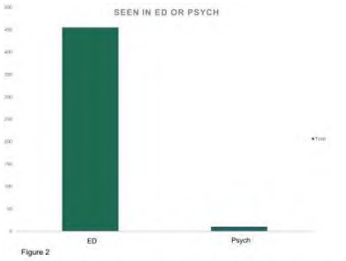

Figure 2

6

Results

- When looking at the chief complaint of the decedents seen in the ED, 20 had a chief complaint of self-harm or suicidal ideation (Figure 3).

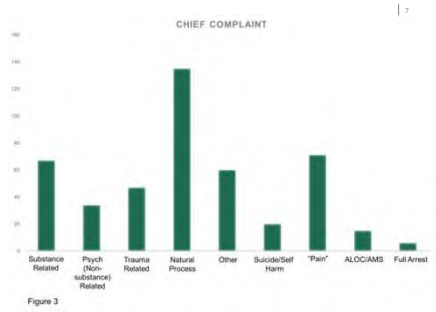

Figure 3

7

Results

- Of those 20, 7 (35%) had an encounter with the ED outside of the year of their death, 4 (20%) within one year, 3 (15%) within six months, 0 within 60 days, 5 (25%) within 30 days, and 1 (5%) within 7 days.
- 3 of the 20 (15%) had previously been seen in the ED for suicide attempt(s). 6 (30%) had prior discharges from the ED to inpatient psych for suicidal ideation(s) and/or suicide attempt(s).
- All 20 deaths were ruled accidental.

8

Conclusions

- A suicide is easy to determine when elements from the scene indicate the MOD, but less so when critical information, such as intent, cannot be accurately assessed.
- Having quick and easy access to medical records would provide additional history and critical information– including reports of self-injurious behavior or intent– leading to increased accuracy of MOD.

9

Conclusions

- Ultimately, further inquiry from medical examiners, who are already performing more autopsies per year than recommended, is likely needed for accurate determination of MOD[2].
- Correctly determining if a death resulting from drug toxicity is an accident or suicide is critical for public health initiatives and reform[3].

10

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Thank you!

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National Survey of Toxicology Rapid Screening Practices in Medical Examiners/Coroner Offices

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Randox Toxicology Ltd, Crumlin, United Kingdom

1

Disclosure Statement

- I am employed by the manufacturer of products discussed in this presentation.
- Case sample data was collected by independent parties, and voluntarily provided to the authors for the review and interpretation presented herein.

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2

Screening vs. Confirmation

Screening	Confirmation
ELISA, lateral flow detection devices, urinalysis cups, multiplex detection	LC-MSMS GC-MS
Sensitive, but selectivity varies	Sensitive and selective for single analytes

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Usage Survey – Design

Twelve-question survey sent to 18 multiplex screening sites

- Specific site applications of in-house multiplex screening
- Number of samples per month
- Kits utilized
- Analytes most often encountered
- Alternative screening and confirmation methods used
- Non-panel analytes encountered

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Usage Survey – Preliminary Results

- 50% of surveys returned from six states nationwide
  - WA, OH, OK, MN, CA, SC
- Median time of use of multiplex screening: ~1 year
- Most common application – general in-house post-mortem toxicology screening
  - Rapid analysis provides case information to investigators, families without lengthy lead times
- Most common sample type – whole blood

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Usage Survey – Preliminary Results

Most observed panel analytes – list five (n=40)

- Fentanyl (20%)
- Methamphetamine (20%)
- Ethylglucuronide (15%)
- THC (13%)
- Amphetamine (10%)
- Cocaine/BZG (10%)

Most observed non-panel analyte

- Xylazine, gabapentin, zolpidem
- 0-3 samples/month

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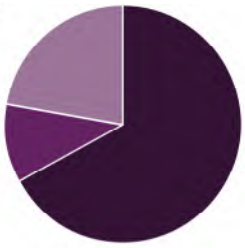
Usage Survey – Preliminary Results

Confirmation Results

- 3rd party public or private lab (67%)
- In-house confirmation (11%)
- No confirmation (22%)



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Multi-Site Correlation Performance

8

Correlation Study – Preliminary Results

28 case sample datasets collected

- Screening performed using multiplex analysis
  - Evidence MultiSTAT - DOA Whole Blood
- Confirmation performed using private 3rd party lab
  - ELISA, LC-MS/MS, LC-TOFMS, Headspace GC-MS

Data was anonymized prior to analysis for confidentiality

Blood Source	N =
Femoral	14
Peripheral	3
Iliac	3
Aortic	2
Subclavian	1
Cardiac	1
Abdominal	1
Heart	1
Hospital	1
Unknown*	1
Total	28

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Correlation Study – Reporting Limits

Analytes not present in confirmation menu:

- ETG
- APVP
- ABCHMINACA
- ABPINACA, PGB (n=28)

Analytes present in confirmation menus, but not in samples:

- BARB
- MDONE,
- PCP
- BUP (n=28)

Assay	Cut Off	Assay	Cut Off
Fentanyl	1 ng/ml	BZO/Cocaine	25 ng/ml
Buprenorphine	2 ng/ml	Oxycodone	10 ng/ml
Amphetamine	50 ng/ml	Cannabinoids (THC)	10 ng/ml
Methamphetamine	50 ng/ml	Tramadol	5 ng/ml
Barbiturates	50 ng/ml	TCA	50 ng/ml
Benzodiazepines	20 ng/ml	ETG	500 ng/ml
6-MAM	10 ng/ml	AB-PINACA	2 ng/ml
Methadone	10 ng/ml	AB-CHMINACA	5 ng/ml
Opiates	50 ng/ml	Alpha-PVP	5 ng/ml
Phencyclidine	5 ng/ml	Pregabalin	1000 ng/ml

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Correlation Study – 100% Agreement

Analyte	Screen Results	Confirm Results +	Confirm Results -	% Agreement
BARB Cut-Off = 50 ng/mL	+	0	6	100%
	-	0	28	
MDONE Cut-Off = 10 ng/mL	+	0	9	100%
	-	0	28	
PCP Cut-Off = 5 ng/mL	+	0	0	100%
	-	0	28	
BUP Cut-Off = 2 ng/mL	+	0	0	100%
	-	0	28	

No submitted case reports included positive results for BARB, MDONE, PCP, BUP

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Correlation Study – 100% Agreement

Analyte	Screen Results	Confirm Results +	Confirm Results -	% Agreement
FENT Cut-Off = 1 ng/mL	+	13	0	100%
	-	0	15	
DPMTE Cut-Off = 80 ng/mL	+	2	0	100%
	-	0	26	
TCA Cut-Off = 60 ng/mL	+	1	0	100%
	-	0	22	
6-MAM Cut-Off = 10 ng/mL	+	1	0	100%
	-	0	27	
TRM Cut-Off = 5 ng/mL	+	1	0	100%
	-	0	22	
MAMP Cut-Off = 50 ng/mL	+	5	0	100%
	-	0	23	

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Discordant Results - Justification

Analyte	Screen Results	Confirm Results +	Confirm Results -	% Agreement
AMPH Cut-Off = 50 ng/mL	+	5	1	96%
	-	0	22	
BENZ Cut-Off = 25 ng/mL	+	7	1	98%
	-	0	25	
OXYC Cut-Off = 10 ng/mL	+	1	1	96%
	-	0	26	

AMPH
- SR2-2: Confirmation method did not include PMA, HCl, BDB

BENZ
- SR2-16: Confirmatioin method did not include six cross-reactive analytes, including glucoronide metabolites

OXYC
- SR2-11: Confirmation method did not include noroxycodone HCl

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Discordant Results - Justification

Analyte	Screen Results	Confirm Results +	Confirm Results -	% Agreement
THC Cut-Off = 10 ng/mL	+	8	3	85%
	-	0	17	

SR2-13, SR2-14, SR2-22:
- Screened positive, confirmed negative
- Confirmation method does not include delta-8-THC
- Cannabinoid instability in post-mortem blood could cause degradation between screening and confirmation[1]

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Discordant Results - Justification

Analyte	Screen Results	Confirm Results +	Confirm Results -	% Agreement
BZG Cut-Off = 10 ng/mL	+	10	3	85%
	-	0	15	

SR1-1, SR1-5:
- Screened positive, confirmed negative via ELISA
- Cocaine instability in post-mortem blood could cause degradation between screening and confirm[2]

SR2-14:
- Confirmation cut-off (100 ng/mL) is significantly higher than screening cut-off

2. Isenschmid DS, Levine BS, Caplan YH. A comprehensive study of the stability of cocaine and its metabolites. J Anal Toxicol. 1989 Sep-Oct;13(5):250-6. doi: 10.1093/jat/13.5.250

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Summary of Preliminary Findings

- Multiplex screening method provided >89% agreement to third party confirmation methods
- Use of in-house multiplex screening generates results for all analytes same-day, no lead-time
- Survey response for non-panel analytes used to adapt multiplex testing (i.e. xylazine)
- Use of in-house screening provides faster turn-around for investigators, families
  - High accuracy allows for faster completion of death investigations[3]

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Future Goals - Expanded Correlation

Increase Participant Count
- Extend correlation study to more multiplex screening sites

Increase Screening Comparisons
- Collect single-analyte screening and corresponding confirmation data for comparison to multiplex

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Questions? Contact Us!

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Special thanks to our participants!

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Evaluation of Pathologist Interpretation of Postmortem CT Scans

Brittany DePasquale, MD & Kimberly Johnson, MD

1

UNM Office of the Medical Investigator

No financial disclosures or conflicts of interest

2

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Postmortem Computed Tomography (PMCT)

- Autopsy is the gold standard
- Optimal environment for utilization of PMCT
  - Increasing workload
  - Limited number of forensic pathologists
  - Familial objection to invasive autopsy
- Use of PMCT is highly variable
  - Scanner availability and price
  - Integration with current workflows
  - Competence and familiarity with image interpretation

3

PMCT & HASCVD

- Hypertensive & atherosclerotic cardiovascular disease (HASCVD) is the most common cause of death in the United States
- Cannot directly visualize myocardial infarction but there are findings that support HASCVD
  - Cardiomegaly
  - Calcifications of heart valves, coronary arteries and peripheral arteries
  - Hemopericardium
  - Atrophic kidneys with perinephric fat stranding

4

OMI Standard Operations

- Every decedent at the OMI undergoes CT imaging prior to autopsy
- Findings reviewed by on-call pathologist and presented at morning report
- PMCT helps triage natural disease deaths
  - Clinically significant natural disease on PMCT → EXTERNAL
  - No clinically significant natural disease on PMCT → AUTOPSY

5

Objectives

- Determine how well forensic pathologists assess the presence of heart disease on PMCT
  - Accuracy
  - Sensitivity & specificity
  - Positive and negative predictive values (PPV & NPV)
- Review cases of discrepancy between PMCT and autopsy findings
- Discuss strengths and limitations of pathologist interpretation of PMCT

6

Methods

- Total of 100 cases
  - Pathologists prospectively evaluated cardiomegaly and coronary artery disease on PMCT before the autopsy → submitted one page form with interpretation
  - Authors retrospectively reviewed autopsy reports
- Exclusion criteria:
  - Decomposition
  - Prior heart surgery
  - Injury to heart

7

Methods

Cardiomegaly

- PMCT
  - Present or not present
  - Subjective
- Autopsy
  - Present or not present
  - Objective: >90th percentile heart weight for age, sex, and body weight

Coronary Artery Disease

- PMCT
  - Absent, mild, moderate, severe
  - Subjective
- Autopsy
  - Percent stenosis
  - Subjective, by pathologist gross interpretation:
    - Mild: 1-25%
    - Moderate: 26-75%
    - Severe: >75%

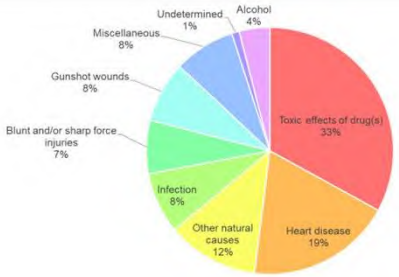
8

Cases

100 cases	
18-92 years old (mean 49 years)	
68 Males	32 Females
48 cases – assessed by attendings	52 cases – assessed by fellows

9

Distribution of Cause of Death



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Results

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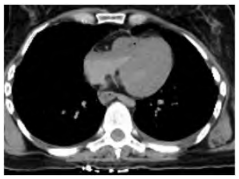
Cardiomegaly

Normal-sized heart



Cardiomegaly

	Present	Absent
Postmortem CT	46	54
Autopsy	35	65

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Cardiomegaly

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		Autopsy	
		Positive	Negative
PMCT	Positive	26	20
	Negative	9	45

Accuracy: 71.0%
Sensitivity: 74.3%
Specificity: 69.2%
PPV: 56.5%
NPV: 83.3%

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Cardiomegaly

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Attendings (n=48)

		Autopsy	
		Positive	Negative
PMCT	Positive	18	10
	Negative	3	17

Accuracy: 72.9%
Sensitivity: 85.7%
Specificity: 63.0%
PPV: 64.3%
NPV: 85.0%

-VS-

Fellows (n=52)

		Autopsy	
		Positive	Negative
PMCT	Positive	8	10
	Negative	6	28

Accuracy: 69.2%
Sensitivity: 57.1%
Specificity: 73.7%
PPV: 44.4%
NPV: 82.4%

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Cardiomegaly

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Attendings (n=48)

		Autopsy	
		Positive	Negative
PMCT	Positive	18	10
	Negative	3	17

Accuracy: 72.9%
Sensitivity: 85.7%
Specificity: 63.0%
PPV: 64.3%
NPV: 85.0%

-VS-

Fellows (n=52)

		Autopsy	
		Positive	Negative
PMCT	Positive	8	10
	Negative	6	28

Accuracy: 69.2%
Sensitivity: 57.1%
Specificity: 73.7%
PPV: 44.4%
NPV: 82.4%

Fellows more likely to take non-natural deaths (younger, otherwise healthier decedents)

15

Cardiomegaly

- Overcalls on PMCT were more common than under calls
- If a natural death, this may impact the examination / triage
- PMCT findings are not the only consideration for triage

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Possible Explanations for Overcalls

- Body mass index (BMI)
- Presence of chamber dilation
- Body positioning during CT scan
- History of decedent bias
- Method of measurement
  - Subjective vs. objective methods

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Cardiomegaly

- BMI

Mean BMI

Non-discrepant (n = 71)	Overcalls (n = 20)	Undercalls (n = 9)
27.0	29.6	28.1

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Cardiomegaly

- Dilation

Non-discrepant (n = 71)	Overcalls (n = 20)	Under calls (n = 9)
30%	35%	44%

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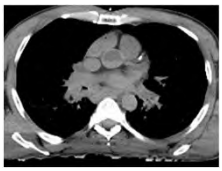
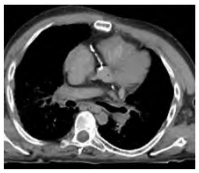
Coronary Artery Disease

Focal calcifications



Confluent calcifications



	Present	Absent
Postmortem CT	40	60
Autopsy	54	46

*including all levels of severity

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Coronary Artery Disease

		Autopsy	
		Positive	Negative
PMCT	Positive	35	5
	Negative	19	41

*including all levels of severity

Accuracy: 76.0%
Sensitivity: 64.8%
Specificity: 89.1%
PPV: 87.5%
NPV: 68.3%

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Coronary Artery Disease

- Overcalls (7)
  - False positives = 5 (present on PMCT but not autopsy)
    - On PMCT, all were called "mild"
    - Focal calcifications on PMCT that were not appreciated at autopsy, or the decedent had calcified vessels without stenosis
  - Overcalling severity = 2 additional cases
    - Both called "severe" on PMCT
    - Both cases showed three vessel involvement at autopsy
      - Unable to estimate percent stenosis on PMCT, likely using number/length of vessels involved to determine severity

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Coronary Artery Disease

- Under calls (33)
  - False negatives = 19 (present at autopsy but not PMCT)
    - Included all ranges of severity
      - mild 10, moderate 6, severe 3
  - Under calling severity = 14 additional cases
    - Called either "mild" (9) or "moderate" (5) on PMCT
    - 13/14 cases varied by one degree of severity
    - One case was called "mild" on PMCT but "severe" at autopsy

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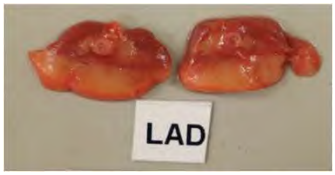
Coronary Artery Disease



Discrepancy could be due to the presence of non-calcific atherosclerosis

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Conclusions

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Forensic Pathologists Can...

Rule out cardiomegaly on PMCT	• Sensitivity > specificity • May be overcalling in some scenarios?
Rule in coronary artery disease on PMCT	• Specificity > sensitivity • More likely to under call due to nature of non-calcified atherosclerosis

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What's Next?

- Evaluate more cases
- Provide more training to pathologists
- Comparison to forensic radiologist PMCT interpretation
- Evaluate other chronic disease with PMCT
  - COPD
  - Infections
  - Hepatic steatosis

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Acknowledgements

- Emily Helmrich, DO
- Lauren Decker, MD
- Lauren Dvorscak, MD
- Daniel Gallego, MD
- Heather Jarrell, MD
- Aiden Kerr, MD
- Audra Kerwin, MD
- Clarissa Krinsky, MD
- Lori Proe, MD
- Sophia Rodriguez, MD
- Michael Harrell, MD
- Harley Schainost, MD
- Jolee Suddock, DO
- Natalie Taylor, MD

28

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QUESTIONS?

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Non-Intentional Structural Collapses as Rare Causes of Mass Fatality Incidents: A Historical Review

William Stano, MD
Maricopa County Office of the Medical Examiner
Phoenix, AZ

1

2

Mass Fatality Incidents (MFIs) Involving Non-Intentional Structural Collapses

Challenges and Preparation

- Fairly rare compared to other MFIs
- Delayed response (safety concerns, prolonged search/recovery)
- Postmortem changes
- Access and logistical issues
- Secondary challenges (fire, hazmat)
- ID issues (open population)
- Prolonged temporary morgue set-up and processing

MARICOPA COUNTY

3

MFIs Involving Non-Intentional Structural Collapses

Injuries

- Mostly blunt force
- Sharp force/dismemberments
- Crush
- Atomization/Pulverization
- Asphyxia
- Secondary (fire, hazmat issues)
- Vicarious trauma

4

Forensic Engineering and Pathology

Strong Similarities

- Forensic Engineering – "The investigation of failures which may lead to legal activity, including both civil and criminal"
- Investigation and data collection
- Complex structure examination
- Specialized education and training

5

5 Deadliest Collapses in United States History

-Honorable Mention – Great Molasses Flood
-Boston – January 2019
-Storage Tank Burst – 2.3 million gallons
-Ensuing Wave – 35 mph, 25 feet high
-Fatalities – 21
-"*Molasses, waist deep, covered the street and swirled and bubbled about the wreckage…here and there struggled a form – whether it was animal or human being was impossible to tell*."

6

Great Molasses Flood

7

5
Willow Island Disaster (1978)

- Power Station, West Virginia
- Cooling tower under construction collapsed
- Fatalities- 51
- Deadliest construction accident in U.S. history
- Scaffolding and concrete issues

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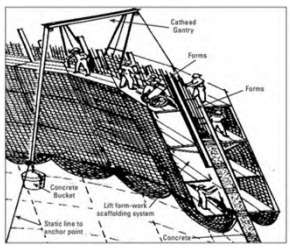
Willow Island Disaster (1978)



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Knickerbocker Theatre Collapse (1922)

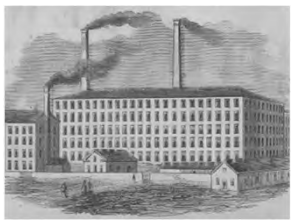
- Washington DC
- Snow accumulation on roof
- Fatalities- 98
- Army Major George S. Patton lead rescue effort
- Poor design; snow not cleared
- Architect and owner -suicides

10

4
Knickerbocker Theatre Collapse (1922)

11

3
Pemberton Mill Collapse (1860)



- Lawrence, Massachusetts
- Overloaded machinery
- Fatalities- ~88-145
- Secondary fire caused most deaths
- Poor construction, load limit
- Led to improved safety standards in industrial workplaces

12

2
Champlain Towers South Collapse (2021)

- Surfside, Florida
- Multifactorial (water, rebar)
- Fatalities- 98

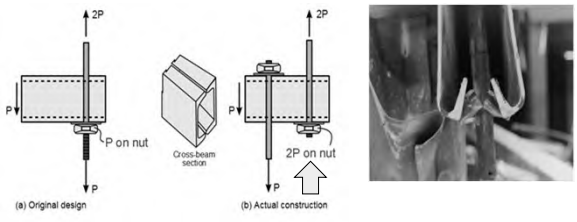
13

1
Hyatt Regency Walkway Collapse (1981)

- Kansas City, Missouri
- Design flaw, lack of communication
- Fatalities- 114
- "The disaster that changed engineering"

14

1
Hyatt Regency Walkway Collapse (1981)



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1

Hyatt Regency Walkway Collapse (1981)

16

Hyatt Regency Today

Renamed- Sheraton Kansas City Hotel at Crown Center

17

Thank You

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18

1

Agenda

- Why we investigate heat-related deaths
- Pathology
- Approach to investigation, data collection, and death certification

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2

Why We Investigate

3

Public Health and Safety

- The largest impact our work has is in helping communities we serve understand death trends so that effective interventions can be developed to reduce morbidity and mortality.
- Heat is the most common weather-related cause of death in the U.S. annually.

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4

Impacts

- Public Policy
  - Energy shut-off prohibitions during summer
  - Trail closures
  - Urban planning
  - Multitude of programs at all levels to respond
- Public Health and Human Services Interventions
  - HVAC repair grants
  - Cooling station locations
  - Support for vulnerable populations

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Impacts

Maricopa County Increases HVAC Fund by $10 Million to Help Homeowners Ahead of Summer

Video >>> Meet Homeowners Who Were Helped

Phoenix, Ariz. (Apr. 17, 2023) – The Maricopa County Board of Su approved a $10 million increase to the HVAC repair and replaceme helps homeowners in the county with the cost of energy efficiency improvement projects.

"Air conditioning isn't a 'nice to have' in the Sonoran Desert. During months, it is a necessity," said Board of Supervisors Chairman Clin District 4. "We have been able to help hundreds of families keep th during the summer heat. And through this program, we often learn other needs and we connect them to additional services."

To date, the County's Home Improvement Program has completed help eligible households. With the additional funding, the County es to 600 households will be supported with HVAC repairs and/or full replacements.

Maricopa County Invests $3.8 Million to Fund Heat Relief Partnerships for People Experiencing Homelessness

Funding Supports Projects in Chandler, Glendale, Mesa, Phoenix, Peoria, and Scottsdale

Video >>>: See Inside Dining Room Doubling as Overnight Heat Relief Shelter

Phoenix, Ariz. (Apr. 26, 2023) – The Maricopa County Board of Supervisors has approved more than $3.8 million in funding that will provide heat relief to people experiencing homelessness. The approval paves the way for partnerships between Maricopa County and the cities of Chandler, Glendale, Mesa, Phoenix, and Scottsdale. In addition, Maricopa County funded overnight weather relief shelter beds at the Human Services Campus.

"Every human life is precious, and while no single entity can end homelessness or solve every issue that contributes to it, I believe we have a moral obligation to do what we can," said Chairman Clint Hickman, District 4. "These shelter services provide more than heat relief; they save lives. I appreciate the partnership on the issue."

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Impacts

Heat-Related Death (HRD) incident locations mapped to Heat-Relief Network Sites for real-time response adjustments

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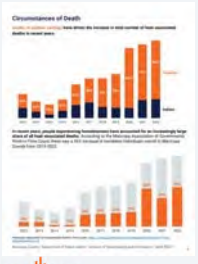
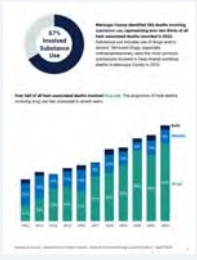
Impacts





County Public Health Reports that provide insights into overlapping societal issues that affect morbidity and mortality.

Weekly during summer months and then annual deep-dive. All based on OME data.

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Need For Consistency

- Diagnosis is challenging
  - Functional abnormalities without specific anatomic findings;
  - Core temperature that is used in clinical diagnosis not reliable in postmortem setting in our environment, and
  - There are no established medical standards for when to include heat
- Certification is challenging
  - "Hyperthermia" is not etiologically specific;
  - Primary cause/contributory cause decisions

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Need For Consistency

- 2018 Internal Consensus Conference
  - Terms-of-art for reliable accounting
  - Criteria for heat as primary versus contributory cause
  - Lumping versus splitting for Cause-of-Death (COD)
  - Manner-of-Death (MOD) options
  - Case- and exam-types
  - Ancillary testing standards
- Annual staff refresher training every May

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In the Sonoran Desert, though nine months of the year are gorgeous, we see an average of 21 days each summer with highs above 110°F.

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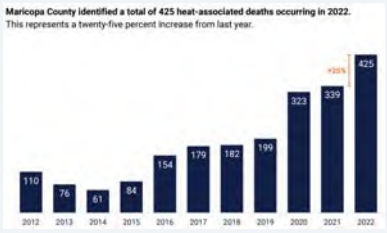
Annual Statistics



Over 1,700 Heat-Related Deaths diagnosed since 2018.

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Pathology

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Pathology

Thermoregulation

- Subtropical evolution left humans with a narrow range of core temperatures we can tolerate.
- Thermoregulation by the anterior hypothalamus

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Pathology

Thermoregulation

- Balance of heat gain and heat loss
  - Gain
  - Loss

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Pathology

Thermoregulation

- Balance of heat gain and heat loss
  - Gain
    - External
    - Internal
      - Metabolism
      - Exertion
  - Loss

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Pathology

Thermoregulation

- Balance of heat gain and heat loss
  - Gain
  - Loss
    - Conduction: substance to substance transfer
    - Convection: substance to substance transfer via liquid
    - Radiation: substance to substance transfer via electromagnetic waves
    - Evaporation: heat loss via conversion of liquid to vapor

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Pathology

Thermoregulation

- Physiologic responses to heat
  - Inhibition of sympathetic activity to dilate skin capillaries (sympathomimetic drugs counteract this response)
  - Increased sweating: 1-2 L/hr can increase to 3 L/hr in acclimatized individuals
  - Decreased urine output and improved electrolyte absorption via aldosterone and antidiuretic hormone (ethanol and caffeine inhibit this)
  - Acclimatization

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Pathology

Thermoregulation

- Physiologic responses to heat
  - Acclimatization
    - Takes 1-2 weeks
    - Sweat onset earlier and with less loss of electrolytes
    - Increased skin blood flow
    - Lower core temperature
    - Lower heart rate
    - More stable circulation

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Pathology

Thermoregulation

- Physiologic responses to heat
  - Acclimatization
    - Best way to acclimatize is with stepped increases in exposure (20% each day)
    - Not lost if in air conditioning or over a weekend, but will lose if no heat exposure for 1-2 weeks (can regain in 2-3 days upon return)
    - Better maintained if physically fit

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Pathology

Heat Illness and Death

- Continuum of dysfunction
  - Edema, tetany, cramps (heat illness)
  - Nausea, vomiting, light-headedness, malaise, myalgia, tachycardia (heat exhaustion)
  - Altered mental status, core temperature >105°F (heat stroke)
- Internal factors in hyperthermia
  - Infection, drugs, CNS lesions involving the hypothalamus
- Exertional and non-exertional types (non-exertional heat stroke cases usually have some other risk factor(s))

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Pathology

Risk Factors for Heat-Related Death

- Environment
- Intrinsic Factors
- Diseases/Illnesses
- Drugs
- Behaviors

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Pathology

Risk Factors for Heat-Related Death

- Environment
  - Exposure to heat index above the “heat death line”

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Pathology

Risk Factors for Heat-Related Death

- Environment

Estimated Heat Index (Apparent Temperature)*

Ambient T	Relative Humidity (%)																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
140	125																				
135	120	128																			
130	117	122	131																		
125	111	116	123	131	141																
120	107	111	116	123	130	139	148														
115	103	107	111	115	120	127	135	143	151												
110	99	102	105	108	112	117	123	130	137	143	150										
105	95	97	100	102	105	109	113	118	123	129	135	142	149								
100	91	93	95	97	99	101	101	107	110	115	120	126	132	138	144						
95	87	88	90	91	93	94	96	98	101	104	107	110	114	124	124	130	136				
90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
80	73	74	75	75	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91
75	69	69	70	71	72	73	73	73	74	74	75	75	76	76	77	77	78	79	79	79	80
70	64	64	65	65	65	66	67	67	68	68	69	69	70	70	70	70	71	71	71	71	72

Heat Death Line

*Adapted from CAP2003 (adapted from Schickele 1947)

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Pathology

Risk Factors for Heat-Related Death

- Environment
  - Exposure to heat index above the "heat death line"
    - Our summers have relative humidity variance by the hour with daily averages from teens to 30s, so above 95°F we start considering heat as a possible factor
    - In more humid climates, risk starts 10+ degrees cooler
  - Low air circulation

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Pathology

Risk Factors for Heat-Related Death

- Intrinsic Factors
  - Age (young children and elderly)
  - High body surface area to body mass ratio (infants)
  - High body mass index

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Pathology

Risk Factors for Heat-Related Death

- Diseases/illnesses
  - Cardiovascular disease
  - Autonomic neuropathies and dystonias
  - Skin diseases, burns and scars
  - Endocrine disorders
  - Psychosis
  - Fever
  - Delirium Tremens
  - Dehydration

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Pathology

Risk Factors for Heat-Related Death

- Drugs
  - Sympathomimetics
  - Ethanol
  - Anticholinergics
  - Antihistamines
  - Tricyclic Antidepressants
  - Diuretics
  - Phenothiazines
  - MAO Inhibitors
  - Lithium
  - Salicylates

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Pathology

Risk Factors for Heat-Related Death

- Behaviors
  - Physical exertion
  - Inappropriate clothing
  - Lack of acclimatization
  - Poor fluid intake

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Pathology

Autopsy Findings

- Nonspecific
  - Decomposition if left in hot environment

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Pathology

Autopsy Findings

- Nonspecific
  - Decomposition if left in hot environment
  - If short survival
    - Serosal petechiae
    - Cerebral edema
    - Periventricular petechiae and neuronal degeneration

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Pathology

Autopsy Findings

- Nonspecific
  - Decomposition
  - If short survival
  - If longer survival
    - Pulmonary edema and ARDS
    - Cerebral edema and neuronal degeneration
    - Centrilobular necrosis
    - ATN
    - Rhabdomyolysis
    - Acute pancreatitis
    - DIC

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The MCOME Approach

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Approach

Investigation and Data Collection

- Assess **high heat exposure risk**
  - **Environment**
  - **Mitigation opportunities**
- Assess **acclimatization** status
- Assess **acute complaints** about heat
- Assess **12 risk factors**
- Collect **vitreous** specimen

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Approach

Investigation and Data Collection

- Assess **high heat exposure risk**: **Environment**
  - Temperatures **above 95°F**?
  - Document **high temperature** and **relative humidity**:
  - Measure **scene temperatures**:
    - Body (areas in and out of shade) and ground near body
    - Wall/ground near thermostat or in shade
    - Thermostat reading
    - If LE reports, ask if planning to turn on AC and ask for temperatures prior to scene response

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Approach

Investigation and Data Collection

- Assess **high heat exposure risk**: **Mitigation opportunities**
  - Air Conditioning (AC) and Evaporative Coolers (EC)
    - Functional or not?
      - If malfunction, how long has it been malfunctioning?
      - Tip: even if it blows air, assess if it's cool
    - On or Off? If On, confirm first responders did not turn on
    - History of usage habits (e.g. turns off at night to save money)
  - Fans (Functional? On/Off?)

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Approach

Investigation and Data Collection

- Assess **high heat exposure risk**: **Mitigation opportunities**
  - Electricity
    - On/Off; if Off, why?
    - Contact utility if needed to assess use; may also assist with date/time-of-death
  - Access to shade/cool environment?
  - Access to water?

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Approach

Investigation and Data Collection

- Assess **acclimatization status**
  - History of high heat exposure routinely over the past two weeks?
- History of **acute complaints** about the heat?
  - If yes: note frequency, duration, and exacerbating/alleviating factors

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Approach

Investigation and Data Collection

Assess **12 risk factors** and document explicitly

1. Age (very young; elderly)
2. History/evidence of exertion?
3. Inappropriate clothing?
4. Poor fluid intake?
5. Not acclimatized?
6. Obesity?
7. Cardiovascular disease?
8. Endocrine disease(s): thyroid; adrenal?
9. Diffuse skin disease/scarring?
10. Psychosis?
11. Substance use disorder (SUD)? Which substances?
12. Medications: list current meds

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Approach

Investigation and Data Collection

- Collect **vitreous** and document attempt even if unsuccessful
  - If the decedent is an infant or there are signs of foul play, contact the on-call ME

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Approach

Investigation and Data Collection

- Case management system "Attribute form" specific to HRDs
  - Checklist
  - High-integrity data for epidemiology

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Approach

Jurisdiction, Body Disposition, and Exam-type

- All potential HRDs are ME cases and should be fully investigated
- Admission for postmortem examination dependent on circumstances
  - If admitted to the hospital, may choose not to admit as long as records sufficient – ME Report still produced
  - ~92% admitted
- Exam type and lab testing are at the Forensic Pathologist's discretion based on the history and circumstances.
  - ~ 75% of HRDs undergo full forensic autopsy

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Approach

Death Certification

- Term-of-art for death certification (primary or contributory causes)
  - **Environmental heat exposure**
  - Etiologically specific and allows accurate counts across submanners

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Approach

Death Certification

- Criteria for **Primary COD** (Part I of the Death Certificate)
  - Exposure above heat death line
  - Acute change in the environment
  - Lack of access to treatment/resolution of the hazard
  - If non-exertional, include risk factors
  - Findings suggesting a heat-related death:
    - Vitreous dehydration pattern
    - Scene markers of heat discomfort (disrobing, vomiting)
    - History of complaints about heat effects
  - No more compelling COD that excludes heat as a factor

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Approach

Death Certification

- Criteria for **Contributory COD** (Part II. Other Significant Causes, OSC)
  - Exposure above heat death line
  - More compelling COD, but one heat can aggravate
- Chronic heat exposure (no acute change) with significant natural disease
  - Weigh all risk factors
  - May exclude heat
- **Lumping** versus splitting for COD/OSC
  - When multiple risk factors for hyperthermia (e.g. drugs and environmental heat), include all (may split between part I and part II)

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Approach

Death Certification

- Manner of Death (MOD) and Submanner of Death (SMOD)
  - Non-natural MOD if heat is COD/OSC
  - SMOD should be the most significant factor (OK if not Environmental – Heat caused/associated)
    - In 2022, 37% had Drug… SMOD

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Thank You

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Medicolegal Death Investigation of Missing and Murdered Indigenous Persons

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No Conflicts of Interest to Disclose

Acknowledgements

Hallie Bongar White and Brenna Hanley
National Tribal Trial College
University of Wisconsin Law School

Dr. Kona Williams
First Nations Liaison for the Ontario Forensic Pathology Service

First Nations Forensic Pathology Working Group in Toronto, Canada
including **Gillian Currie, Reuven Jhirad,**
Annelind Wakegijig, and Rene Hepburn

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Learning Objective

Promote awareness of the importance of culturally competent medicolegal death investigation of Missing and Murdered Indigenous Persons (MMIP)

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Medicolegal Death Investigation of MMIP – Concerns

- Gap in cultural competency
- Coroner and Medical Examiner offices often unfamiliar with tribal concepts of death, rituals, treatment of the deceased, and the use of culturally appropriate terminology
  - Believed to result in further injury to the deceased
  - Strict practices including burial within 24 hours, objection to autopsy, and prohibitions against contact with non-tribal members
  - May fail to consider cultural and community practices as possible factors in the cause of death

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Medicolegal Death Investigation of MMIP - Concerns

- Rural reservations often served by lay coroners
- Body is removed from tribal lands for postmortem examination
- Survivors (family, friends, community, etc.) may be re-traumatized by interactions with untrained medicolegal death investigators
- Survivors may be reluctant to cooperate with the death investigation
  - Decreased comprehension of perpetrators
  - Sows distrust in the criminal justice system
  - May allow serial offenders to go free
  - Negatively impacts community policing efforts

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Medicolegal Death Investigation of MMIP – Concerns

- Coroners and Medical Examiners have largely been excluded from focused efforts by the federal government or Tribal Community Response Plans to improve the investigations of MMIP
- Religious and spiritual practices around death and autopsies vary across jurisdictions
- Currently no training opportunities for Coroners or Medical Examiners on working with Indigenous peoples and tribes
- No national standards or competency requirements for death investigation of MMIP

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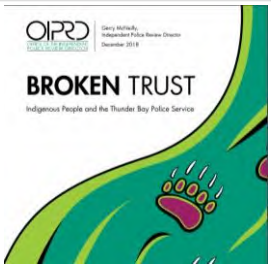
Indigenous People and the Thunder Bay Police Service



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Indigenous People and the Thunder Bay Police Service - Findings

- Inadequate/problematic death investigations
- Attempted to explain these deficiencies based on workload, lack of training, and lack of resources
- Racism
  - "Investigators failed on an unacceptably high number of occasions to treat the deceased and his or her family equally and without discrimination because the deceased was Indigenous"
  - "Repeatedly relied on generalized notions about how Indigenous people likely came to their deaths and acted, or refrained from acting, based on those biases"

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Medicolegal Death Investigation of MMIP – Goals

Problem solving, collaborative, respectful, culturally appropriate death investigations that will honor the deceased, the survivors, and their communities without compromising the necessities of the investigation itself

https://www.facebook.com/mmipandfamilies/photos/a.110153697000250/4929680087188815/?type=3

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Medicolegal Death Investigation of MMIP – Solutions

- Enormous task, as Indigenous people are not a singular monolith of culture, language, or tradition
- Historical distrust of the government, law enforcement, and healthcare
- Success will depend heavily on communication and transparency
- Reach out directly in order to develop relationships
  - Tribal liaison as point of contact
  - Next of Kin Clinics

https://ovc.ojp.gov/news/featured-resources/may-2022-featured-resources

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Medicolegal Death Investigation of MMIP – Solutions

- Allow traditional medicine practitioners or victim rights advocates to be present during the autopsy
  - Mitigate spiritual damage to the deceased
- Prioritize return of the deceased's remains
  - Repatriation of ancestral skeletal remains
  - Retention of tissues/organs
- Address racism during training while increasing opportunities, mentorship, and support
- Be aware and start a conversation

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Medicolegal Death Investigation of MMIP – Opportunities

- Develop an informed practices guide on the recovery of MMIP in collaboration with Coroners and Medical Examiners
- Position paper from the National Association of Medical Examiners (NAME) on culturally competent postmortem examinations
- Model memorandum of understanding (MOU) between Coroners and Medical Examiners with federally recognized tribes to encourage interjurisdictional collaboration

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Thank You!

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Decreasing Tuberculosis Exposure:

Supplanting Autopsy with Postmortem Computed Tomography and Fine-Needle Aspiration Biopsy

Jordan Taylor, MD

October 17, 2023

National Association of Medical Examiners Annual Meeting

Outline

- Case presentation
- Tuberculosis
- Post-mortem computed tomography
- Fine-needle aspiration biopsy
- Microbiology
- Summary

Case history

- 70-year-old man
- Cook at restaurant
- Felt well until approximately 6 pm
- Felt suddenly unwell
- Vomited frank blood in bathroom
- Collapsed
- Approximately 30 mins of CPR before pronouncement

Case presentation - background

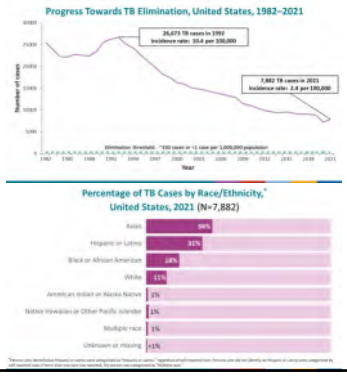
- Medications: aceclofenac, acetamol, ibuprofen, acetaminophen, pseudoephedrine, metoprolol, tamsulosin, and aspirin
- Past medical history: high blood pressure, benign prostatic hyperplasia
- No history of alcohol, tobacco, or illicit drugs
- Immigrated from India

Tuberculosis signs and symptoms

- Cough +/- hemoptysis
- Fever
- Chest pain
- Chills
- Weight loss
- Fatigue
- Night sweats

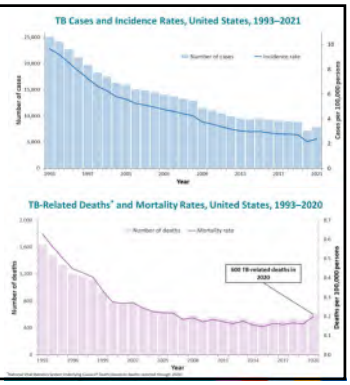
Tuberculosis incidence

- ~13 million people in the US are living with latent TB
- Incidence changes with race/ethnicity



TB deaths

- Incidence rates generally trend with death rates
- 2020: 600 TB-related deaths
- Include good samples for collection in live people



TB exposure reduction at autopsy

- Personal protective equipment
  - N95 and face shield minimum
  - Powered air-purifying respirator
- Negative pressure autopsy suite
- Decreased personnel
- Minimally invasive autopsy

Tuberculosis sample collection

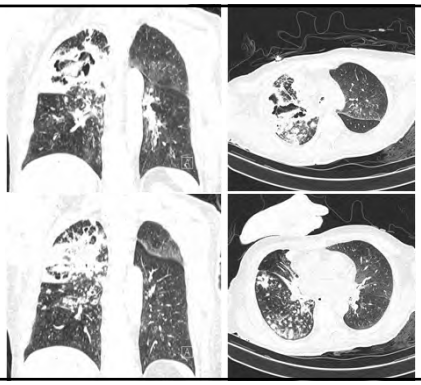
- Living patient ideal sample:
  - Expectorated or induced sputum
- Decedent collection:
  - Sputum (if available)
  - Tissue sampling

Post-mortem computed tomography

- General use in office
  - Homicides
  - Undetermined
  - MVCs
  - Falls
  - Drownings
  - Unidentified bodies
  - External-ed overdoses
    - Rule out trauma
  - Other cases of interest
- Use on this case
  - Concern for tuberculosis
  - Rule out trauma
  - Identify underlying disease

PMCT

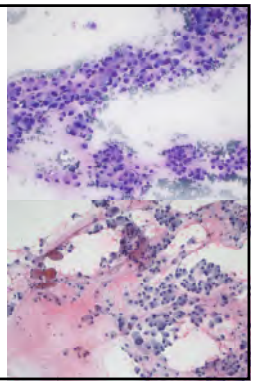
- Right lung upper lobe cavitary lesion
- Surrounding hemorrhage
- Satellite lesions/hemorrhage
- Other findings: cholelithiasis



External examination

- External examination
  - Rare abrasions
  - Medical intervention
- Sputum seen emanating from nose and mouth
  - Collected for microbiological testing

Cytology



Fine-needle aspiration biopsy at autopsy

Use of Cytology as an Auxiliary Diagnostic Tool in Autopsies

Luana Andrade[]; Vitória Lana Massarente[]; Stéphanie C. Geanete Pozzan, MD, PhD[]; and Mau

Needle Autopsy to Establish the Cause of Death in HIV-Infected Hospitalized Adults in Uganda: A Comparison to Complete Autopsy

Kalungi, MD, PhD,‡§ Eric Van Marck, MD, PhD,‖ Kambugu, MD,† Ann M. Nelson, MD,# obert Colebunders, MD, PhD††*

Cytodiagnosis in the Autopsy Suite

A Tool for Improving Autopsy Quality and Resident Education

Vicki J. Schnadig, MD; Claudia P. A

Clinical and Needle Autopsy Correlation Evaluation in a Tertiary Care Teaching Hospital

A Prospective Study of 50 Cases From the Emergency Department

Meenakshi Garg Bansal, MD, Rajpal S. Punia, MD,* and Atul Sachdev, MD, DM†*

Cytology

- Using a long needle typically used to collect urine, several passes of the right lung lesion were collected
- Smears were made and a material for a cell block and additional microbiologic studies was collected

https://en.wikipedia.org/wiki/Lung_biopsy

Microbiology results

- NEGATIVE for 2019-Novel Coronavirus
- NEGATIVE for Influenza types A and B
- TISSUE FINE NEEDLE ASPIRATE
  - MYCOBACTERIUM TUBERCULOSIS COMPLEX – 18 days later
- SPUTUM FACE AND MOUTH
  - MYCOBACTERIUM TUBERCULOSIS COMPLEX appears to be same as other culture(s) collected on same date – 23 days later

Final Cause and Manner of Death

- CAUSE OF DEATH: Complications of mycobacterium tuberculosis.
- MANNER OF DEATH: Natural.

Summary

- Tuberculosis is a potential dangerous and highly communicable disease
- We have good systems of reducing the risk of infection at autopsy
- Given new advances in imaging and techniques we can further reduce that risk
- Utilizing PMCT and cytology can decrease the risk of infectious disease and increase efficiency at autopsy

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Thank you!

- San Francisco Office of the Chief Medical Examiner
  - Autopsy technicians including Vince Ayala
  - Dr. Chistopher Liverman
  - Dr. Ellen Moffatt
  - Dr. Jun Guan
  - Dr. Karen Zeigler
  - Dr. Amy Hart
- San Francisco General Hospital
  - Dr. Jeff Whitman and the microbiology department
- King County Medical Examiner's Office
  - Exposure to needle biopsies for COVID

Unveiling the shadows: exploring the mysterious cocaine-sex deaths of Miami-Dade county in the 1980's

Dr . Lorraine Lopez Morell
Dr. Deanna A. Oleske

1

NOTHING TO DISCLOSE

2

COCAINE: A BRIEF HISTORY

- South America
  - 60 g leaves/d= 300 mg
- 1855: Albert Nieman
  - cocaine alkaloid
- Local anesthetic
- Vin Mariani

3

Early Observations of Cocaine Toxicity

- Injected or inhaled
- Mattison –1887-88
- 1914: Recreational cocaine outlawed
  - Harrison Narcotics Tax Act
- 1970-80s

4

Understanding of Mechanism of Death

- 1975
  - Excitation via CNS effects
  - Confusion
  - Seizures
  - Depression
  - Respiratory failure and collapse
- 1978
  - Studies showing cardiovascular effects of cocaine

5

Acute cocaine intoxication in the conscious dog: pathophysiologic profile of acute lethality

Abstract

1978

- Increased blood pressure
- Increased heart rate
- Increased respiratory rate
- Increased blood lactate

6

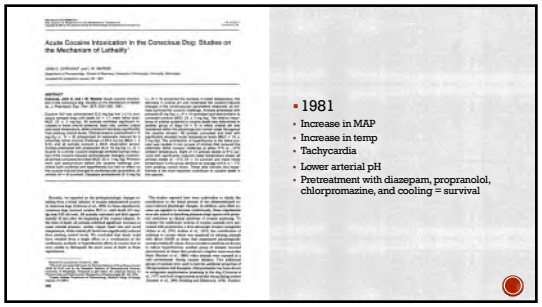
A Lethal Aphrodisiac

Drugs, 'Kinky Sex' Blamed in Woman's Death

1980

First mention in press linking sex and cocaine with death

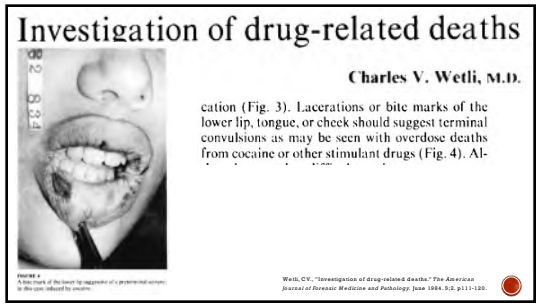
7



Acute Cocaine Intoxication in the Conscious Dog: Studies on the Mechanism of Lethality*

- 1981
- Increase in MAP
- Increase in temp
- Tachycardia
- Lower arterial pH
- Pretreatment with diazepam, propranolol, chlorpromazine, and cooling = survival

8



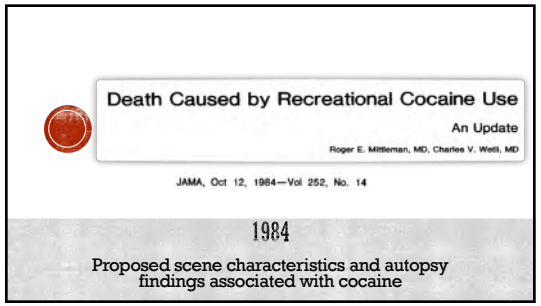
Investigation of drug-related deaths

Charles V. Wetli, M.D.

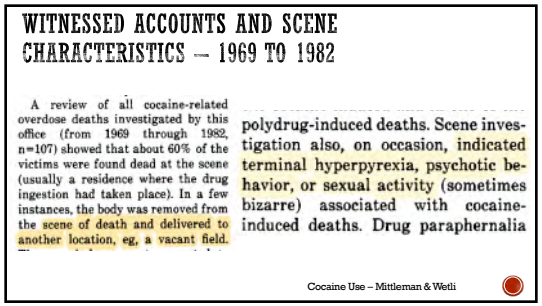
cation (Fig. 3). Lacerations or bite marks of the lower lip, tongue, or cheek should suggest terminal convulsions as may be seen with overdose deaths from cocaine or other stimulant drugs (Fig. 4). Al-

Wetli, CV., "Investigation of drug-related deaths." *The American Journal of Forensic Medicine and Pathology.* June 1984. 5:2. p111-120.

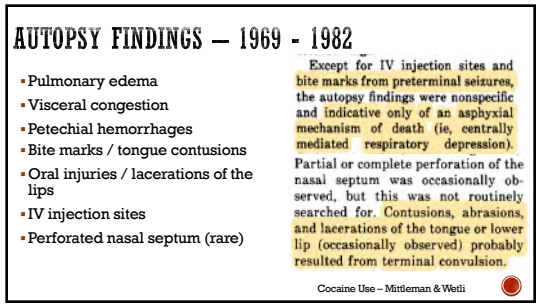
9


Death Caused by Recreational Cocaine Use
An Update
Roger E. Mittleman, MD; Charles V. Wetli, MD
JAMA, Oct 12, 1984—Vol 252, No. 14
1984
Proposed scene characteristics and autopsy findings associated with cocaine

10


WITNESSED ACCOUNTS AND SCENE CHARACTERISTICS — 1969 TO 1982
A review of all cocaine-related overdose deaths investigated by this office (from 1969 through 1982, n=107) showed that about 60% of the victims were found dead at the scene (usually a residence where the drug ingestion had taken place). In a few instances, the body was removed from the scene of death and delivered to another location, eg, a vacant field.
polydrug-induced deaths. Scene investigation also, on occasion, indicated terminal hyperpyrexia, psychotic behavior, or sexual activity (sometimes bizarre) associated with cocaine-induced deaths. Drug paraphernalia
Cocaine Use – Mittleman & Wetli

11


AUTOPSY FINDINGS — 1969 - 1982
Pulmonary edema
Visceral congestion
Petechial hemorrhages
Bite marks / tongue contusions
Oral injuries / lacerations of the lips
IV injection sites
Perforated nasal septum (rare)
Except for IV injection sites and bite marks from preterminal seizures, the autopsy findings were nonspecific and indicative only of an asphyxial mechanism of death (ie, centrally mediated respiratory depression).
Partial or complete perforation of the nasal septum was occasionally observed, but this was not routinely searched for. Contusions, abrasions, and lacerations of the tongue or lower lip (occasionally observed) probably resulted from terminal convulsion.
Cocaine Use – Mittleman & Wetli

12

TOXICOLOGY OF COCAINE - 1978-1982

Cocaine alone

Average: **6.2** mg / L
Range: **0.1 to 20.9** mg / L

Polytoxicity (Cocaine + others)

Average: **2.7** mg / L
Range: **0.2 to 17.8** mg / L

13

1985

Charles V. Wetli,[1] M.D. and David A. Fishbain,[2] M.D.

Cocaine-Induced Psychosis and Sudden Death in Recreational Cocaine Users

- Proposed mechanism of psychosis and cocaine toxicity

14

REFERENCE: Wetli, C. V. and Fishbain, D. A., **"Cocaine-Induced Psychosis and Sudden Death in Recreational Cocaine Users,"** *Journal of Forensic Sciences*, JFSCA, Vol. 30, No. 3, July 1985, pp. 873–880.

ABSTRACT: Fatal cocaine intoxication presenting as an excited delirium is described in seven recreational cocaine users. Symptoms began with the acute onset of an intense paranoia, followed by bizarre and violent behavior necessitating forcible restraint. The symptoms were frequently accompanied by unexpected strength and hyperthermia. Fatal respiratory collapse occurred suddenly and without warning, generally within a few minutes to an hour after the victim was restrained. Five of the seven died while in police custody. Blood concentration of cocaine averaged 0.6 mg/L, about ten times lower than that seen in fatal cocaine overdoses. Police, rescue personnel, and emergency room physicians should be aware that excited delirium may be the result of a potentially fatal cocaine intoxication; its appearance should prompt immediate transport of the victim to a medical facility. Continuous monitoring, administration of appropriate cocaine antagonists, and respiratory support will hopefully avert a fatal outcome.

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2 deaths blamed on cocaine

By LYNNE DUKE
Herald Staff Writer

The deaths of two women, whose partially nude bodies were found a day and five blocks apart in Overtown locations known for heavy crack cocaine use, were ruled accidental due to cocaine intoxication Friday.

The timing and location of the deaths had stirred fear and curiosity in the community. Neither woman's body showed any signs of trauma or struggle.

But Miami Homicide Lt. Ed Carberry said the circumstances surrounding the two deaths were coincidental. Melanie Taylor, 26, and Winifred Samuels, 22, were linked only by their drug use and the way it killed them.

"I think the real story behind this whole thing is the tragedy that it is," Carberry said.

Samuels, known by friends as "Wimp," was found at 7:30 a.m. Monday in the boiler room of an apartment building at 240 NW Ninth St. She was nude from the waist down and a pair of panties was lying on her chest beneath her hand, Carberry said.

Taylor was found shortly after noon the next day on a second-story landing of an abandoned and boarded-up apartment building at 1430 NW Second Ave. She too was nude from the waist down.

Dr. Bruce Hyma, an associate Dade County medical examiner, said bite marks on Taylor's tongue and lips were consistent with the seizures that cocaine intoxication victims suffer. Most conclusively, though, was the cocaine found in her brain.

Carberry said paraphernalia consistent with crack use was found at both scenes, including cocaine residue and numerous burnt matches.

If he learned that someone was with the women at the time they died, Carberry said he would confer with the Dade State Attorney's office to see if there were grounds for criminal charges.

"It's probable that someone was with them shortly before their death. They were probably having sexual contact," he said.

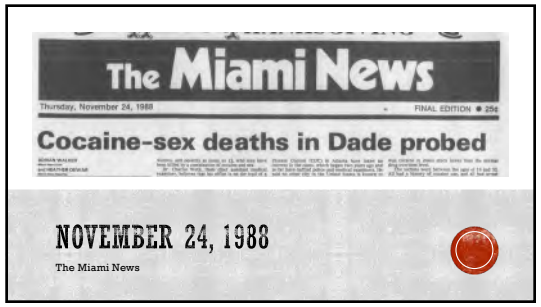
THE MIAMI HERALD – AUGUST 1, 1987

- Two women
- Partially nude
- Five blocks apart
- Police: coincidence

16

1988

17



The Miami News

Thursday, November 24, 1988 FINAL EDITION 25¢

Cocaine-sex deaths in Dade probed

NOVEMBER 24, 1988

The Miami News

18

"We've got a First-class medical mystery on our hands."
– Dr. Charles Wetli

The Miami News, November 24, 1988

Dr. Charles Wetli is an expert on the effects of cocaine.

19

"The typical scene is in a cheap room, a clump of bushes or an abandoned building," Wetli said. "The woman is naked from the waist down, her clothes are scattered around. . . . At first glance, she looks like she's been raped and murdered."

But "the autopsies have conclusively showed that these women were not murdered," he said.

All but one of the cases have been classified as "cocaine intoxication accidents," said Dr. Roger Mittleman, assistant medical examiner — but doctors don't know why the cocaine killed the women.

The best theory now, according to Wetli and two other medical examiners, is that the women died from something like "cocaine psychosis" — sudden death from low doses of cocaine that cause the victims to go berserk and die within minutes.

But "the autopsies have conclusively showed that these women were not murdered," he said.

Miami News – November 24, 1988

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"For some reason, the male of the species becomes psychotic, and the female of the species dies in relation to sex" while using cocaine, Wetli said. "But this is all just serious speculation at this point. . . . We've got a first-class medical mystery on our hands."

Miami News – November 24, 1988

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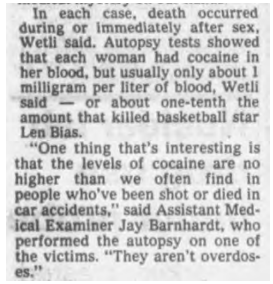

In each case, death occurred during or immediately after sex, Wetli said. Autopsy tests showed that each woman had cocaine in her blood, but usually only about 1 milligram per liter of blood, Wetli said — or about one-tenth the amount that killed basketball star Len Bias.

"One thing that's interesting is that the levels of cocaine are no higher than we often find in people who've been shot or died in car accidents," said Assistant Medical Examiner Jay Barnhardt, who performed the autopsy on one of the victims. "They aren't overdoses."

- Cocaine levels were not impressive

Miami News – November 24, 1987

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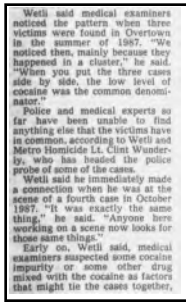

Wetli said medical examiners noticed the pattern when three victims were found in Overtown in the summer of 1987. "We noticed then, mainly because they happened in a cluster," he said. "When you put the three cases side by side, the low level of cocaine was the common denominator."

Police and medical experts so far have been unable to find anything else that the victims have in common, according to Wetli and Metro Homicide Lt. Clint Wunderly, who has headed the police probe of some of the cases.

Wetli said he immediately made a connection when he was at the scene of a fourth case in October 1987. "It was exactly the same thing," he said. "Anyone here working on a scene now looks for those same things."

Early on, Wetli said, medical examiners suspected some cocaine impurity or some other drug mixed with the cocaine as factors that might tie the cases together,

- Fourth similar case
- ? Impurity in cocaine

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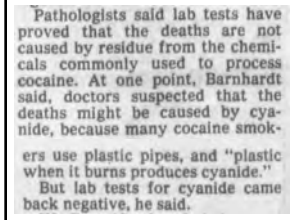

Pathologists said lab tests have proved that the deaths are not caused by residue from the chemicals commonly used to process cocaine. At one point, Barnhardt said, doctors suspected that the deaths might be caused by cyanide, because many cocaine smokers use plastic pipes, and "plastic when it burns produces cyanide."

But lab tests for cyanide came back negative, he said.

- Theorizing cyanide contributed

Miami News – November 24, 1987

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Wetli said the medical examiners will hold a two-hour meeting with police next week to discuss the patterns in the cases.

Wunderly said he hadn't been told of the medical examiner's finding that none of the cases were homicides. Once he is officially notified of that finding, he said, he will close the books on the cases and look no further.

Miami News – November 24, 1986

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The first of the mystery cocaine deaths occurred in September 1986, and there have been 11 others since, said Mittleman, who is collecting data on the cases for a research paper that the Dade pathologists plan to publish.

Mittleman said three of those 12 cases eventually may be eliminated from the study. One victim's blood showed no trace of cocaine during preliminary screening, one victim had a cocaine level slightly higher than the others, and another victim was a skeleton by the time her body was found, making drug tests impossible, he said.

- Plans to publish case series

Miami News – November 24, 1986

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Dade pathologists said CDC experts have agreed with the theory that the deaths are caused by some female version of cocaine psychosis. CDC spokesman Chuck Fallis refused to comment, saying the agency never discusses results of investigations before they are published in medical journals.

Miami News – November 24, 1986

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"For some reason, …. the female of the species dies in relation to sex."
- C. Wetli

"They aren't overdoses."
- Jay Barnhardt

"….the autopsies have conclusively showed that these women were not murdered."
- C. Wetli

Miami News – November 24, 1988

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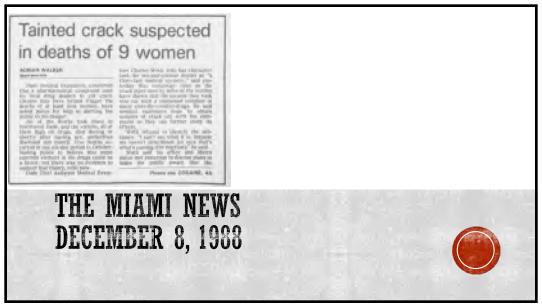

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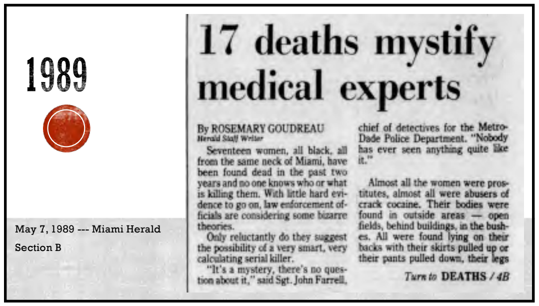

1989

17 deaths mystify medical experts

By ROSEMARY GOUDREAU
Herald Staff Writer

Seventeen women, all black, all from the same neck of Miami, have been found dead in the past two years and no one knows who or what is killing them. With little hard evidence to go on, law enforcement officials are considering some bizarre theories.

Only reluctantly do they suggest the possibility of a very smart, very calculating serial killer.

"It's a mystery, there's no question about it," said Sgt. John Farrell, chief of detectives for the Metro-Dade Police Department. "Nobody has ever seen anything quite like it."

Almost all the women were prostitutes, almost all were abusers of crack cocaine. Their bodies were found in outside areas — open fields, behind buildings, in the bushes. All were found lying on their backs with their skirts pulled up or their pants pulled down, their legs

Turn to **DEATHS / 4B**

May 7, 1989 --- Miami Herald
Section B

31

Odd theories offered in string of puzzling deaths

The Miami Herald
May 7, 1989

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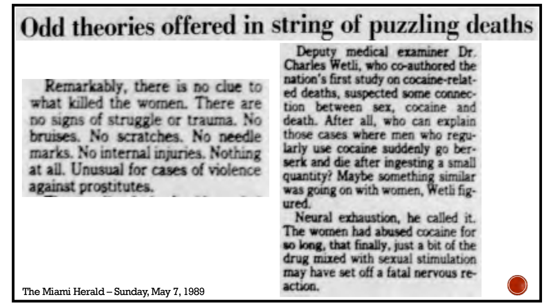

Odd theories offered in string of puzzling deaths

Remarkably, there is no clue to what killed the women. There are no signs of struggle or trauma. No bruises. No scratches. No needle marks. No internal injuries. Nothing at all. Unusual for cases of violence against prostitutes.

Deputy medical examiner Dr. Charles Wetli, who co-authored the nation's first study on cocaine-related deaths, suspected some connection between sex, cocaine and death. After all, who can explain those cases where men who regularly use cocaine suddenly go berserk and die after ingesting a small quantity? Maybe something similar was going on with women, Wetli figured.

Neural exhaustion, he called it. The women had abused cocaine for so long, that finally, just a bit of the drug mixed with sexual stimulation may have set off a fatal nervous reaction.

The Miami Herald – Sunday, May 7, 1989

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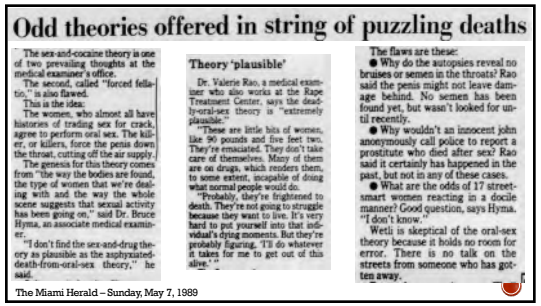

Odd theories offered in string of puzzling deaths

The sex-and-cocaine theory is one of two prevailing thoughts at the medical examiner's office.

The second, called "forced fellatio," is also flawed.

This is the idea:

The women, who almost all have histories of trading sex for crack, agree to perform oral sex. The killer, or killers, force the penis down the throat, cutting off the air supply.

The genesis for this theory comes from "the way the bodies are found, the type of women that we're dealing with and the way the whole scene suggests that sexual activity has been going on," said Dr. Bruce Hyma, an associate medical examiner.

"I don't find the sex-and-drug theory as plausible as the asphyxiated-death-from-oral-sex theory," he said.

Theory 'plausible'

Dr. Valerie Rao, a medical examiner who also works at the Rape Treatment Center, says the deadly-oral-sex theory is "extremely plausible."

"These are little bits of women, like 90 pounds and five feet two. They're emaciated. They don't take care of themselves. Many of them are on drugs, which renders them, to some extent, incapable of doing what normal people would do.

"Probably, they're frightened to death. They're not going to struggle because they want to live. It's very hard to put yourself into that individual's dying moments. But they're probably figuring, 'I'll do whatever it takes for me to get out of this alive.'"

The flaws are these:

- Why do the autopsies reveal no bruises or semen in the throats? Rao said the penis might not leave damage behind. No semen has been found yet, but wasn't looked for until recently.
- Why wouldn't an innocent john anonymously call police to report a prostitute who died after sex? Rao said it certainly has happened in the past, but not in any of these cases.
- What are the odds of 17 street-smart women reacting in a docile manner? Good question, says Hyma. "I don't know."

Wetli is skeptical of the oral-sex theory because it holds no room for error. There is no talk on the streets from someone who has gotten away.

The Miami Herald – Sunday, May 7, 1989

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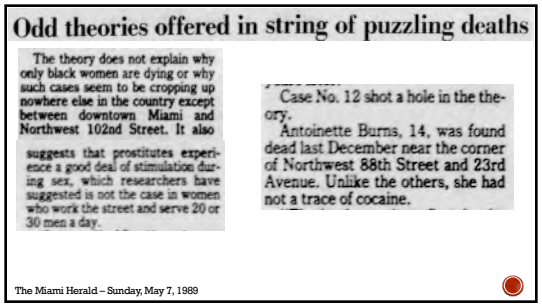

Odd theories offered in string of puzzling deaths

The theory does not explain why only black women are dying or why such cases seem to be cropping up nowhere else in the country except between downtown Miami and Northwest 102nd Street. It also suggests that prostitutes experience a good deal of stimulation during sex, which researchers have suggested is not the case in women who work the street and serve 20 or 30 men a day.

Case No. 12 shot a hole in the theory.

Antoinette Burns, 14, was found dead last December near the corner of Northwest 88th Street and 23rd Avenue. Unlike the others, she had not a trace of cocaine.

The Miami Herald – Sunday, May 7, 1989

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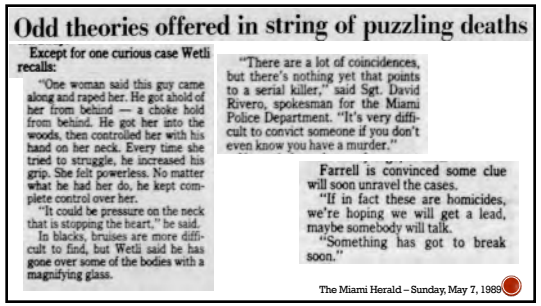

Odd theories offered in string of puzzling deaths

Except for one curious case Wetli recalls:

"One woman said this guy came along and raped her. He got ahold of her from behind — a choke hold from behind. He got her into the woods, then controlled her with his hand on her neck. Every time she tried to struggle, he increased his grip. She felt powerless. No matter what he had her do, he kept complete control over her.

"It could be pressure on the neck that is stopping the heart," he said.

In blacks, bruises are more difficult to find, but Wetli said he has gone over some of the bodies with a magnifying glass.

"There are a lot of coincidences, but there's nothing yet that points to a serial killer," said Sgt. David Rivero, spokesman for the Miami Police Department. "It's very difficult to convict someone if you don't even know you have a murder."

Farrell is convinced some clue will soon unravel the cases.

"If in fact these are homicides, we're hoping we will get a lead, maybe somebody will talk.

"Something has got to break soon."

The Miami Herald – Sunday, May 7, 1989

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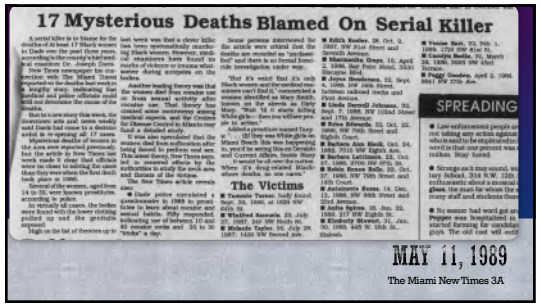

17 Mysterious Deaths Blamed On Serial Killer

SPREADING

MAY 11, 1989

The Miami New Times 3A

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MAY 14, 1989
LOS ANGELES TIMES

Deaths baffle Miami

38

For a long time, the prevailing theory about the deaths was a highly unusual one — that the prostitutes died from the toxic effects of cocaine accompanied by the stimulation of sex. Neural exhaustion, Deputy Chief Medical Examiner Charles Wetli called it.

If true, that would explain the partially disrobed bodies. Cheap hookers often exchange sex for crack cocaine. They ply their trade in abandoned buildings or the tall weeds of vacant lots.

The theory has an impressive advocate. Back in the late 1970s, Wetli was among the first to show that cocaine, even in modest amounts, could lead to death. He is the co-author of articles commonly cited in texts and journals, implicating the drug in a variety of fatal illnesses.

The Tampa Bay Times – May 14, 1989

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"In men, we're finding that crack — in amounts 10 times lower than a basic overdose — sometimes triggers psychotic episodes where a guy just goes berserk, starts running a real high fever, then just dies."

Maybe these women, then, were victims of prolonged binges on crack, living on the edge until even the relatively low arousal of sex-for-hire was enough to finally induce a fatal reaction.

To some, however, the theory has always seemed far-fetched. Why were the prostitutes dying in only one part of the county? Or, for that matter, in one part of the state or the nation?

The Tampa Bay Times – May 14, 1989

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Then, last December, Body No. 12 was found. Antoinette Burns, age 14, died in a junk-strewn yard under a Brazilian pepper tree. She was lying on her back. Her skirt was pulled up. Everything fit the pattern.

Or almost everything. The girl's body tested clean for drugs. There was no evidence she worked the streets.

And that complicated the riddle. Either the teen-ager did not belong on the list — or her case tipped the scales further toward homicide.

The Tampa Bay Times – May 14, 1989

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TAMPA BAY TIMES – MAY 14, 1989

© Los Angeles Times

MIAMI — In what has become a bizarre and persistent pattern, 17 women have died here in the past two and a half years. All of them young. All of them black. All of them found in empty lots or gutted buildings.

Almost all were prostitutes. Almost all held traces of cocaine in their systems. Almost all were discovered naked from the waist down, with their legs spread apart.

For a long time, the prevailing theory about the deaths was a highly unusual one — that the prostitutes died from the toxic effects of cocaine accompanied by the stimulation of sex. Neural exhaustion, Deputy Chief Medical Examiner Charles Wetli called it.

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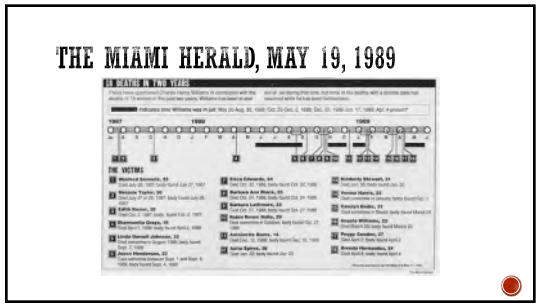
THE MIAMI HERALD, MAY 19, 1989

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Local News

WEDNESDAY, MAY 31, 1989 THE MIAMI HERALD SECTION B

Coroner: Somebody killed 19 women

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Examiner: Somebody killed 19 women

Herbert Dobbs Jr., ex-airline executive

MAY 31, 1989 THE MIAMI HERALD

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Suspect is linked to 19th slaying

MIAMI HERALD - NOVEMBER 6, 1989

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Local News

TUESDAY, SEPTEMBER 5, 1989 THE MIAMI HERALD SECTION B

Dead women had links to rapist

Convicted rapist Charles Henry Williams, left, says connections to the dead women are a coincidence. Police see a pattern, but they haven't charged Williams with murder.

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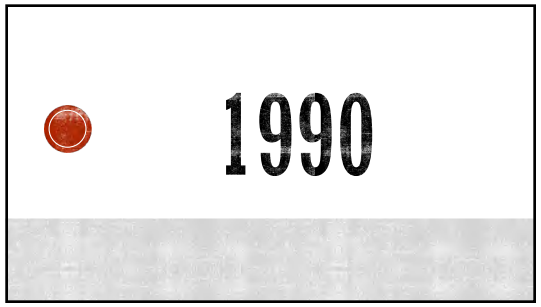
1990

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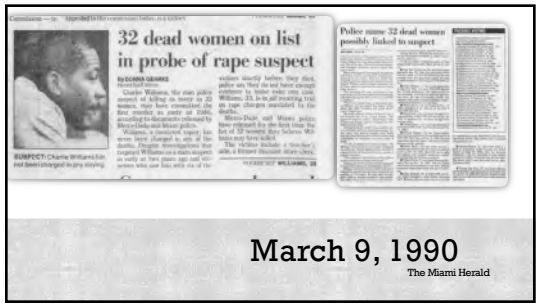
32 dead women on list in probe of rape suspect
Police name 32 dead women possibly linked to suspect
March 9, 1990
The Miami Herald

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Police name 32 dead women possibly linked to suspect
MARCH 9, 1990
The Miami Herald

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Missed calls, close calls mar serial killings case
How probe of 32 deaths kept going astray
The Miami Herald – April 28, 19

51

How investigation of 32 deaths kept going astray

As deaths rose, police denied serial killer lurked

For a while, pathologists in the medical examiner's office promoted a theory of death by sex-and-cocaine, later proved false.

"It misled us at first when we didn't find trauma in the neck," said Dr. Roger Mittleman, associate medical examiner. The Spires murder case, where the undercover narcotics cop ignored the public love-making, didn't reach a courtroom for the same reason the 31 other cases didn't.

Melanie Taylor, 26, and Winifred Samuels, 27 — both neighbors of Williams — were found dead a day apart in July 1987.

Both were semi-nude, lying next to crack paraphernalia. Samuels' body was found in a meter room at 240 NW North St., her clothing scattered in the cubicle. Taylor was found dead on a back porch of a crack hangout at 1430 NW Second Ave.

Miami police announced both died of drug overdoses. Lt. Ed Carberry told reporters the deaths were not related.

Associate Medical Examiner Bruce Hyma autopsied Taylor. He found "no visible trauma" and said specifically the cause of death "is not strangulation."

Associate Medical Examiner Jay Barshart autopsied Samuels. He didn't find trauma either.

In April 1988, the nude body of Sharmanita Grays, 16, was found in a stairwell of the Bay Point Motel, 3530 Biscayne Blvd.

Associate Medical Examiner Jan C. Garavaglia autopsied Grays. "The preponderance of evidence indicates that this is a cocaine-related death of a prostitute probably during sex," she concluded.

What the pathologist didn't know was that the victim's family suspected murder and that Williams, a neighbor, admitted to police he was with the teen-ager at the motel shortly before the death.

The Miami Herald – April 30, 19

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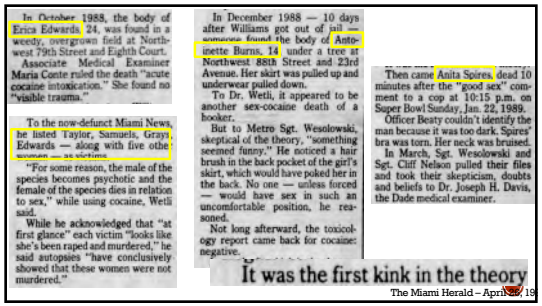

In October 1988, the body of Erica Edwards, 24, was found in a weedy, overgrown field at Northwest 79th Street and Eighth Court.

Associate Medical Examiner Maria Conte ruled the death "acute cocaine intoxication." She found no "visible trauma."

To the now-defunct Miami News, he listed Taylor, Samuels, Grays, Edwards — along with five othe

"For some reason, the male of the species becomes psychotic and the female of the species dies in relation to sex," while using cocaine, Wetli said.

While he acknowledged that "at first glance" each victim "looks like she's been raped and murdered," he said autopsies "have conclusively showed that these women were not murdered."

In December 1988 — 10 days after Williams got out of jail — someone found the body of Antoinette Burns, 14, under a tree at Northwest 88th Street and 23rd Avenue. Her skirt was pulled up and underwear pulled down.

To Dr. Wetli, it appeared to be another sex-cocaine death of a hooker.

But to Metro Sgt. Wesolowski, skeptical of the theory, "something seemed funny." He noticed a hair brush in the back pocket of the girl's skirt, which would have poked her in the back. No one — unless forced — would have sex in such an uncomfortable position, he reasoned.

Not long afterward, the toxicology report came back for cocaine: negative.

Then came Anita Spires, dead 10 minutes after the "good sex" comment to a cop at 10:15 p.m. on Super Bowl Sunday, Jan. 22, 1989.

Officer Beaty couldn't identify the man because it was too dark. Spires' bra was torn. Her neck was bruised.

In March, Sgt. Wesolowski and Sgt. Cliff Nelson pulled their files and took their skepticism, doubts and beliefs to Dr. Joseph H. Davis, the Dade medical examiner.

It was the first kink in the theory

The Miami Herald – April 30, 19

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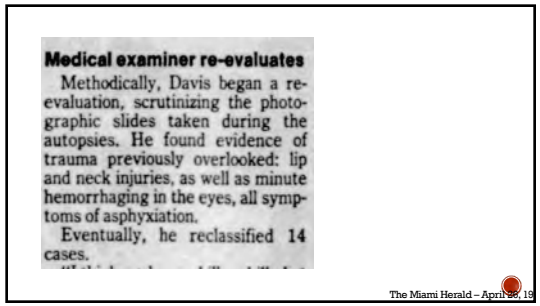

Medical examiner re-evaluates

Methodically, Davis began a re-evaluation, scrutinizing the photographic slides taken during the autopsies. He found evidence of trauma previously overlooked: lip and neck injuries, as well as minute hemorrhaging in the eyes, all symptoms of asphyxiation.

Eventually, he reclassified 14 cases.

The Miami Herald – April 30, 19

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Witness details attack

By DONNA GEHRKE
Herald Staff Writer

The alleged rape victim of Charles Henry Williams testified Wednesday that Williams choked her from behind, dragged her to a junkyard and raped her, all the while threatening to kill her if she screamed.

"He kept saying, 'Shut up or I'll kill you,'" she told the six jurors and two alternates.

The 30-year-old woman was the first to testify in Williams' rape trial. Police suspect Williams in the deaths of as many as 32 women, but don't have enough evidence to charge him with any of the deaths.

The Miami Herald – April 28, 19

55

YOUNGEST VICTIM: Antoinette Burns' death was different.

POSSIBLE VICTIMS

Charles Henry Williams is suspected of killing the following 32 women:

Metro-Dade Police Department cases

1. Alta Mae Townsend, 26, found Aug. 23, 1981
2. Wilda Brown, 24, found Nov. 17, 1983
3. Cynthia Driver, 21, found Feb. 13, 1984
4. Debra Martin, 26, found Nov. 19, 1987
5. Kathy Roberts, 23, found Dec. 18, 1987
6. Patricia Cochran, 30, found Jan. 9, 1988
7. Paula Poole, 23, found Jan. 19, 1988
8. Carolyn Bryant, 31, found Aug. 15, 1988
9. Linda Dorhet Johnson, 32, found Sept. 7, 1988
10. Erica Edwards, 24, found Oct. 22, 1988
11. Barbara Black, 25, found Oct. 24, 1988
12. Barbara Lattimore, 22, found Oct. 27, 1988
13. Robin Renee Rolle, 29, found Oct. 27, 1988
14. Antoinette Burns, 14, found Dec. 12, 1988
15. Verlie Harris, 22, found Feb. 1, 1989
16. Carolyn Bodie, 31, found March 24, 1989
17. Angela Williams, 23, found March 26, 1989
18. Peggy Gooden, 27, found April 2, 1989
19. Brenda Hernandez, 25, found April 4, 1989

Miami Police Department cases

1. Cassy Williams, 17, found April 16, 1982
2. Rose Bailey, 33, found Jan. 10, 1984
3. Patricia Johnson, 19, found Nov. 3, 1984
4. Kevin Hicks, 19, found Feb. 23, 1985
5. Melanie Taylor, 26, found July 20, 1987
6. Winifred Samuels, 23, found July 27, 1987
7. Edith Rozier, 28, found Oct. 2, 1987
8. Sharmanita Grays, 16, found April 2, 1988
9. Joyce Henderson, 32, found Sept. 4, 1987
10. Valerie Jean King, 23, found Oct. 20, 1988
11. Anita Spires, 26, found Jan. 23, 1989
12. Sondra Jackson, 21, found March 24, 1989

Hialeah Police Department case

1. Kimberly Stewart, 31, found Jan. 30, 1989

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DOD	Name	Age	Sex	Location	Cocaine Blood	Cocaine Brain	Original MOD
9/1/86	Tammie Turner	28	F		0.89mg/L	1.07 mg/kg	accident
7/27/87	Winifred Samuels	23	F	in a rear maintenance area	0.49 mg/L	0.56 MG/L	accident
7/28/87	Melanie Taylor	26	F	back porch	<0.05 mg/L	0.10 mg/Kg	accident
10/2/87	Edith Rozier	28	F	field	0.38 mg/L		accident
4/2/88	Sharmanita Grays	16	F	outside of staircase of a motel	<0.05mg/L	0.12mg/Kg	accident
9/4/88	Joyce Henderson	32	F	under a trailer near railroad tracks	0.2mg/L		accident
9/7/88	Linda Johnson	32	F	in a field under a tree	lung - undetected		unknown
10/22/88	Erica Edwards	24	F	field	1.31 mg/L		accident
10/24/88	Barbara Ann Black	25	F	yard of her house	none detected	none detected	homicide
10/27/88	Robin Renee Rolle	29	F	wooded lot with drag marks	0.15 mg/L	not performed	accident
10/27/88	Barbara Ann Lattimore	23	F	concession area of abandoned drive-in movie	<0.10 mg/L		Homicide
12/12/88	Antoinette Burns	14	F	in a field under a tree	none detected	none detected	accident
1/2/89	Anita Spires	26	F	in an alley -- was witnessed by police	0.27 mg/L		homicide
1/30/89	Kimberly Stewart	31	F	rear alley	1.9mg/L		accident
2/1/89	Vanessa Harris	22	F	field	not performed	not performed	Homicide
3/24/89	Carolyn Bodie	31	F	wooded lot	none detected	none detected	Homicide
3/26/89	Angela Michelle Williams	23	F	backyard of a building	0.23mg/L		homicide
4/2/89	Peggy Gooden	27	F	outside of an unoccupied building	<0.1 mg/L		homicide
4/4/89	Brenda Hernandez	21	F	open field	1.26mg/L		homicide

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1994

58

Dade rapist dies of AIDS

The man, who was suspected of raping and then killing 52 women, died while waiting to stand trial in a murder case.

SARASOTA HERALD-TRIBUNE / MONDAY, SEPTEMBER 26, 1994

59

SPIRES, ANITA (REMAINS, UNKNOWN)
26 BLACK FEMALE DOB NOV/29/62
1865 NW 45 ST., MIAMI, FLA.

PLACE OF DEATH: FOUND: REAR OF 217 NW 8TH STREET, MIAMI, FLORIDA.
TIME OF DEATH: FOUND 10:35 PM JAN/22/89

INVESTIGATING AGENCY: MIAMI #0221937-M/ DET.COOPER

INCIDENT LOCATION: REAR OF 217 NW 8TH STREET, MIAMI, FLORIDA.
JAN/22/89 PM. SCENE M.E. ROGER E. MITTLEMAN MD

HISTORY: IFP

ACCORDING TO INITIAL POLICE INVESTIGATION, ON JANUARY 22, 1989 IN THE P.M., MIAMI POLICE UNITS WERE RAIDING A DRUG GAMBLING AREA. TWO OFFICERS APPROACHED FROM BEHIND. THEY JUMPED A FENCE AND OBSERVED A BLACK MALE AND A BLACK FEMALE (THE DECEASED), HAVING SEX. THE OFFICER SPOKE TO THE BLACK MALE. THE DECEASED DID NOT SPEAK, HOWEVER SHE HAD ONE ARM AROUND THE BLACK MALE AND HER LEGS UP AND OPEN. THE OFFICER CONTINUED ON HIS RAID, AND WHEN HE RETURNED ABOUT FIVE TO TEN MINUTES LATER, FOUND THE DECEASED UNRESPONSIVE. FIRE RESCUE WAS CALLED AND UPON ARRIVAL FOUND THE DECEASED EXPIRED. HOMICIDE INVESTIGATORS RESPONDED TO THE SCENE AND VIEWED THE DECEASED LYING SUPINE ON GROUND, WITH LEGS AND ARMS OPEN. THERE WERE NO VISIBLE SIGNS OF TRAUMA.

60

DADE COUNTY MEDICAL EXAMINER DEPARTMENT, Miami, Florida

Name...BODIE,.Carolyn.....Case No. 89-883

forward extension and elevation of the arms. The curly black hair is slipping from its scalp anchorage. The eyes are destroyed by maggots. The trunk and lower extremities have no evidence of injury. Very slight residual rigor mortis which is easily broken is noted in the lower part of the lower extremities. There are no identifying features in the clothing.

SCENE IMPRESSION (INCLUDING PROBABLE CAUSE AND MANNER OF DEATH):

Probable drug related death occurring during sexual activity

NOTE: The foregoing is of a speculative nature and subject to modification pending additional information and investigation.

Jay S. Barnhart, Jr., M.D.
Associate Medical Examiner

JSB:rf

61

CURRENT UNDERSTANDING

- 2023
  - Dopamine
  - Serotonin
  - Norepinephrine
  - Cardiotoxicity
    - Sympathetic effects: tachycardia, hypertension, contractility, vasospasm

62

CLASSICAL MISTAKES IN FORENSIC PATHOLOGY

WARD BURDICK AWARD ADDRESS

ALAN R. MORITZ, M.D.

Institute of Pathology, Western Reserve University, Cleveland, Ohio

The[re] are several unique features of the mistakes that are peculiar to the performance of medicolegal autopsies. One is the frequency with which mistakes are made by good pathologists. Another is the frequency with which a seemingly trivial error turns out to have disastrous consequences. Perhaps fewer mistakes would be made if there were more widespread appreciation of what constitutes a mistake in the performance of a medicolegal autopsy, and why it is a mistake.

The factual material upon which this discussion is based is derived from several sources. First are the mistakes that I have made. In the course of 30 years, their number and variety have become formidable. Another source of information represents the mistakes that other pathologists have made in the performance of medicolegal autopsies. I have learned of these errors from reading their autopsy protocols or from performing second autopsies on exhumed bodies. Inasmuch as I was not sure that I had either made or heard about all of the important mistakes that should be brought to your attention, I recently made inquiry of a group of colleagues who have had large experience in the field of forensic pathology. Their replies constitute my third source of information.

63

Mistake of Talking Too Soon, Too Much, or to the Wrong People

Too much. Do not let your desire to be helpful or to play the role of Sherlock Holmes lead you into the mistake of saying more than the facts warrant. A

64

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65

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66

RETHINKING COGNITIVE BIAS

Paul S. Uribe, MD (LTC, Ret)

Deputy Chief Medical Examiner
Fort Bend County Medical Examiner's Office
Rosenberg TX

Former Director, Office of the Armed Forces Medical Examiner
(Investigative branch of the Armed Forces Medical Examiner System)

DMH Forensic Consulting
www.dmhforensics.com

1

FORT BEND COUNTY

- Demographics
  - Population 882k (2020) and growing
  - 10th most populous county in Texas
- Fort Bend County Medical Examiner Office in Rosenberg TX
  - Opened December 2019
  - Covers Fort Bend County and 14 outlying counties
  - Professional staff of 5 board-certified medical examiners

2

FORT BEND COUNTY MEDICAL EXAMINER OFFICE GROWTH

DECEMBER 2019

AUGUST 2023

3

OBJECTIVES

- Define cognitive bias
- See the negative effects of cognitive bias in forensic pathology
- Provide examples of how to practically mitigate cognitive bias in forensic practice

4

DEFINITION OF COGNITIVE BIAS

- A systematic error in thinking that occurs when people are processing and interpreting information and the world around them
- Chronic inaccuracy in how a person observes or interprets information
- Unconscious in nature

5

ORIGINS OF COGNITIVE BIAS

- Upbringing
- Experience
- Values
- "Because I was trained that way"
- Things that shape your worldview

6

"We don't see things as they are, we see them as we are."

Anais Nin

7

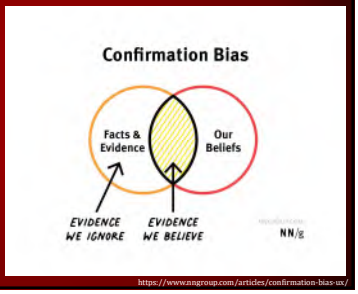
POINT 1:

COGNITIVE BIAS IS REAL AND CAN AFFECT DECISIONS

8

CONFIRMATION BIAS

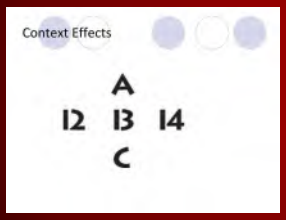
Tendency to favor information that confirms or strengthens their believes or values



https://www.nngroup.com/articles/confirmation-bias-ux/

9

CONTEXTUAL BIAS



Context alters perception and interpretation

https://image1.slideserve.com/3040128/context-effects-1.jpg

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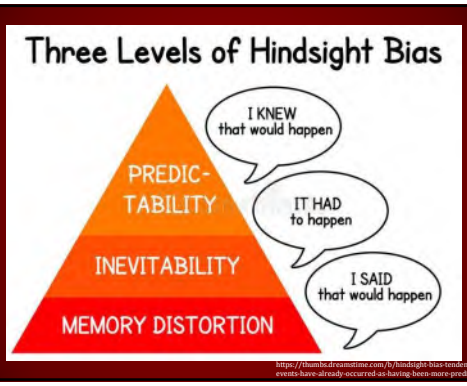

https://thumbs.dreamstime.com/b/hindsight-bias-tendency-people-to-perceive-events-have-already-occurred-as-having-been-more-predictable-than-181173849.jpg

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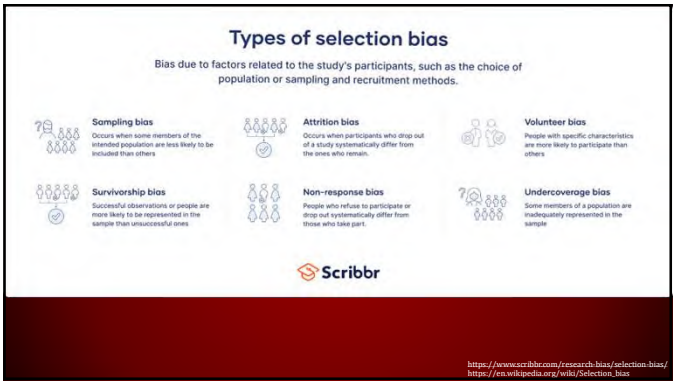


https://www.scribbr.com/research-bias/selection-bias/
https://en.wikipedia.org/wiki/Selection_bias

12

MY COGNITIVE BIAS DURING OPIATE EPIDEMIC

- Pre-autopsy assumptions:
  - Found with drug paraphernalia = drug death
  - Not found with drug paraphernalia = r/o drug death
  - Younger than 40, no trauma = drug death
  - Natural disease, no trauma = rule out drug death
  - Hotel room = drug death or suicide
  - Released from prison the day before = drug death
  - Bad teeth = drug death
  - Good teeth = r/o drug death, not meth
  - Nye County NV = meth + heat
  - Anywhere in NJ = Fentanyl

13

ASCERTAINMENT BIAS

- Prosecution likes inculpatory evidence
- Defense likes exculpatory evidence
- Which side you're on limits what evidence you see
- Just because it's admissible, doesn't make it good evidence
- Just because it's not admissible, doesn't make it bad evidence

14

WHAT COGNITIVE BIAS IS NOT

- Conscious bias
  - Racism, sexism
- Corruption/fraud
  - Individual
  - Institutional
- Being overworked and looking for shortcuts to expedite a case
- Unethical/criminal conduct

15

EVERY DECISION IS ROOTED IN COGNITIVE BIAS

16

ANY ERROR FROM ANY DECISION CAN BE ATTRIBUTED TO SOME FORM OF COGNITIVE BIAS

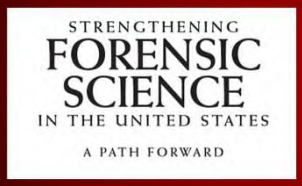
17

Point 2

MEDICAL EXAMINERS ARE NOT IMMUNE TO THE NEGATIVE EFFECTS OF COGNITIVE BIAS

18

WHAT'S THE BIG DEAL?



- National Research Counsel, 2009: Recognized cognitive bias in the forensic sciences.
- "Research has been sparse on the important topic of cognitive bias in forensic science – both regarding their effects and methods for minimizing them"

19


Received: 26 November 2020 | Revised: 11 February 2021 | Accepted: 11 February 2021

DOI: 10.1111/1556-4029.14697

JOURNAL OF FORENSIC SCIENCES

PAPER

General

Cognitive bias in forensic pathology decisions

Itiel Dror PhD[1] | Judy Melinek MD[2] | Jonathan L. Arden MD[3] | Jeff Kukucka PhD[4] | Sarah Hawkins JD[5] | Joye Carter MD, PhD[6] | Daniel S. Atherton MD[7]

20

WHAT'S THE BIG DEAL?

- Dror, et al, has initated a discussion about cognitive bias causing errors in forensic pathology.
- Dror claims pathologists are resistant to this idea.
- Pathologists accuse Dror of accusing the entire field of forensic pathology as unconsciously racist

21

THE PROPOSED SOLUTIONS

- Using blinding and masking techiques that prevent exposure to task irrelevant information.
- Using methods such as linear sequential unmasking to control the sequence, timing, and linearity of exposure to information, so as to minimize "going backward" and being biased by the reference materials.
- Using case managers that screen and control what information is given to whom and when.
- Using blind, double blind, and proper verifications when possible.
- Rather than have one reference target or hypothesis, have a "lineup" of competing and alternative conclusions and hypotheses.
- Adopting a differential diagnosis approach, where all different conclusions and their probability are presented rather than one conclusion.

22

RESISTANCE IN THE MEDICAL EXAMINER COMMUNITY

- Bad study design
- Accusatory conclusions
- Untenable solutions

23

CLAIM: "USING IRRELEVANT OR ERRONEOUS CONTEXTUAL INFORMATION CAN CAUSE ERRORS IN MANNER OF DEATH DETERMINATION"

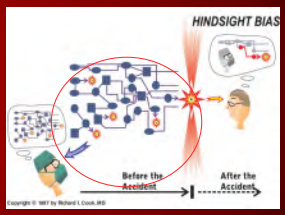
24

Point 3

THE DEFINITION OF "IRRELEVANT NON-MEDICAL INFORMATION" IS ARBITRARY AND SUBJECTIVE

25

- "Irrelevant non-medical information" must be excluded from the decision making process
  - Cannot prospectively define what information is "non-medical" and "irrelevant"
  - Must pre-categorize what information is "irrelevant" and withhold/exclude that information
  - Can only know what information is "irrelevant" in hindsight
  - "Irrelevant" information excluded by case managers



26

IS RACE "IRRELEVANT NON-MEDICAL INFORMATION"?

27

Point 4

WHAT IS FORENSIC PATHOLOGY "ERROR"?

28

SOURCES OF LABORATORY ERROR

- Clinical Pathology:
  - Pre-analytic factors
  - Analytic factors
  - Post-analytic factors
- Anatomic Pathology:
  - Minor and major discrepancies
- Sentinel Events

29

FORENSIC PATHOLOGY ERROR?

- Mistake in cause of death?
- Mistake in manner of death?

Routine death certification for vital statistics purposes

- MOD Homicide when it's not
- Missed homicide
- Wrong suspect
- Bad evidence
- Bad timelines
- Unscientific forensic opinions

Cognitive bias
Lack of information
Erroneous information
Other factors

30

WHAT CONTRIBUTES TO ERRORS IN FORENSIC PATHOLOGY?

- Cognitive bias

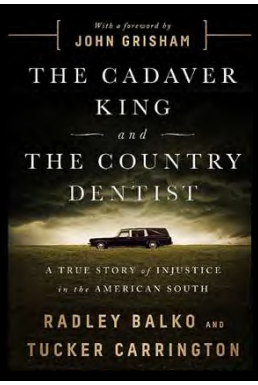
- Ignorance
- Incompetence
- Arrogance/hubris
- Corruption/fraud
- Unethical conduct

Not cognitive bias

31

ARE THE SIGNIFICANT ERRORS IN FORENSIC PATHOLOGY DUE TO COGNITIVE BIAS, OR OTHER FACTORS?

32



COGNITIVE BIAS?

33

Point 5

FORENSIC PATHOLOGY IS MEDICINE, AND CONTEXT CANNOT BE REMOVED FROM MEDICINE

34

Contents lists available at ScienceDirect

Forensic Science International: Synergy

journal homepage: www.sciencedirect.com/journal/forensic-science-international-synergy

Contextual information in medicolegal death investigation decision-making: Manner of death determination for cases of a single gunshot wound

Itiel E. Dror [a,*], Dwayne A. Wolf [b], Garrett Phillips [c], Si Gao [b], Yijiong Yang [d], Stacy A. Drake [e]

[a] University College London, United Kingdom
[b] Harris County Institute of Forensic Science, USA
[c] Bexar County Medical Examiner's Office, USA
[d] The University of Texas Health Science Center at Houston, USA
[e] Texas A&M University, USA

- Conclusion: "the impact of the contextual information was so powerful that many participants changed initial autopsy-based conclusions to align with the contextual information"
- "The influence of contextual information on manner of death must be recognized."

35

What is the manner of death?

https://webpath.med.utah.edu/FORHTML/FOR018.html

36

MANNER OF DEATH IS A CONTEXTUAL, CULTURAL, AND TRADITIONAL DETERMINATION MADE BY THE DEATH CERTIFIER FOR VITAL STATISTICS PURPOSES, NOT LEGAL ONES.

37

MISINTERPRETATION OF ROLES

- "Forensic Pathologists play a critical part in administering justice because of their role in criminal investigations and court proceedings, as they determine whether the manner of death was homicide vs something else"
- Dror, et al. Cognitive bias in forensic pathology decisions.
- "It is to be emphasized that the classification of homicide for the purposes of death certification is "neutral" term and neither indicates nor implies criminal intent, which remains a determination within the province of legal processes."
- Hanzlick R. Cause of death and the death certificate. CAP Publication, 2014.

38

YOU ONLY HAD ONE JOB

- Our job according to cognitive science:
  - Step 1: evaluate wound as a contact gunshot wound.
  - Get relevant context later.
- Our actual job:
  - Prior to step 1: get scene information and history, ID body, gather evidence, determine type of examination
  - Step 1: evaluate wound as a contact gunshot wound.
  - Step 2: use context to determine if wound was self-inflicted
  - Step 3: await toxicology, appropriate ancillary studies (if applicable)
  - Step 4: sign death certificate with cause and manner of death

39

CONTEXT IS CRITICAL TO IDENTIFYING THE RIGHT QUESTIONS

- Evidence that supports the narrative
- Evidence that goes against the narrative
- Aware of pitfalls/mimics
- Testing your hypotheses, develop alternate ones

40

IF YOU REMOVE THE CONTEXT FROM FORENSIC PATHOLOGY, THE AUTOPSY BECOMES A PURELY TECHNICAL PROCEDURE

41

Point 6

LINEAR-SEQUENCIAL UNMASKING-EXPANDED (LSU-E), AS CURRENTLY DEFINED, IS NOT IMPLEMENTABLE IN FORENSIC PATHOLOGY

42

LINEAR SEQUENTIAL UNMASKING- EXPANDED

- "The aim of LSU-E is not to deprive experts of the information they need, but rather to minimize bias by providing that information in the optimal sequence".
- Always begin with the actual data/evidence.

43

EXAMPLES OF LSU-E

- CSI investigating the crime scene first and developing their impression derived solely from the crime scene and nothing else.
- Receiving "relevant" contextual information before commencing evidence collection.
- "Experts should, at least initially, form their opinion based on the raw data itself before being given any further information that could influence their opinion."

44

LSU-E

- Principle: "always begin with the actual data/evidence – and only that data-evidence – before considering any other contextual information, be it explicit or implicit, reference materials, or any other contextual or meta-information"
- Implication: "black box" autopsy

45

THREE CRITERIA FOR SEQUENCING INFORMATION

- Biasing power
- "The non-biasing relevant information be put before the more strongly biasing relevant information in the order of exposure"
- Assumption: that you know what information is more biasing than others during the investigation

46

THREE CRITERIA FOR SEQUENCING INFORMATION

- Objectivity
- "More objective information be put before the less objective information in the order of exposure."
- Implication: "black box" autopsy first

47

THREE CRITERIA FOR SEQUENCING INFORMATION

- Relevance
- "The more relevant information is put before the more peripheral information in the order of exposure, and –of course – any information that is totally irrelevant to the decision should be omitted altogether."
- Assumption: you know what information is relevant vs irrelevant beforehand
- Implied: you already know the absolute truth

48

"BLACK BOX" AUTOPSIES ARE TO BE AVOIDED

- Injuries can be described without context
- Injury interpretation without context is impossible
- Unnecessary procedures (or not the right ones)
- Shotgun toxicology/ancillary testing
- Expensive/inefficient

49

RUN BY CASE MANAGERS

- Predetermined arbitrary determinations of "relevant" vs "irrelevant" information
- Will be overworked, just like FPs
- Unspecified training
- Fundamental role is to limit "irrelevant" information
- Replacement of one set of biases for another

50

THE BIAS CAUSED BY NON-OPTIMAL INFORMATION SEQUENCING IS FAR LESS OF A THREAT THAN ERRORS MADE FROM THE LACK OF OR ERRONEOUS INFORMATION.

51

Point 7

INCORPORATE PRACTICAL WAYS TO COMBAT THE NEGATIVE EFFECTS OF COGNITIVE BIAS

52

SELF-REFLECTION

- Individual biases:
  - Why did you choose this field?
  - What are your weaknesses and how are you improving them?
  - Admit you could be wrong.
  - What are your biases (and if you say none, you are lying to yourself)?

53

INSTITUTIONAL BIASES

- Who do you work for?
  - Be aware of external pressures to "bend" forensic opinions to match a narrative.
  - Evaluate quality, relevance, sources of contextual material
- "Top cover": leadership having your back
- Is your medical examiner/coroner office independent?

54

IMPLEMENTING GOOD PRACTICES

- Peer review/case conferences
  - Consider blinding the cause/manner on review
  - Thorough dive into case, not superficial lip service
  - QC routine cases, not just the complicated ones
  - Rigorous QC, not just typo correction
- Consider blinding video evidence until after autopsy
  - Police-related deaths
  - Body cam footage
  - Surveillance video

55

BENEFITS OF A QC PROGRAM

- Improve quality of reports and quality of practice.
- Better presentation/product
- Consistent application of terminology
- "Devil's advocate"
- Finding weaknesses in your argument/logic

56

PITFALLS OF A QC PROGRAM

- Groupthink/"rubber stamping"
- Tendency towards the punitive
- Corrections of "style" over substance
- What happens in strong disagreements?
  - Does leadership decide?
  - Taking names off of reports
  - "Well, if you can defend it"

57

CONSIDER SPECIAL REVIEW PROCEDURES FOR:

- High profile/visibility cases
  - Reviewing the key details/timelines:
    - Estimating time of death
    - Estimating/dating of wounds
    - Sequencing of injuries
- Forensic panel reviews?

58

SYSTEMIC IMPROVEMENTS

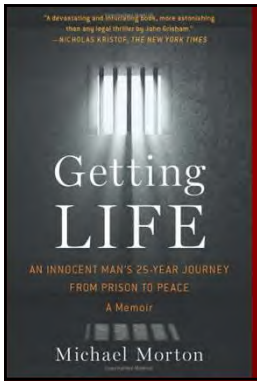
- Cognitive bias training
- Improve quality control review processes
- Improve quality/duration of training?
- Forensic M&M Conferences?
- Addressing the "bad apples"

59

CASES OF EGREGIOUS FORENSIC MALPRACTICE

- Corruption, fraud, "hired gun", incompetence
- Unscientific experts roam unchecked
- Hurts the professional as a whole.
  - Role of Institutional quality control?
  - Role of professional organizations
  - Role of state medical boards??
- Punishments for bombastic, unscientific testimony?
  - Targeting individuals on personal/professional/political differences

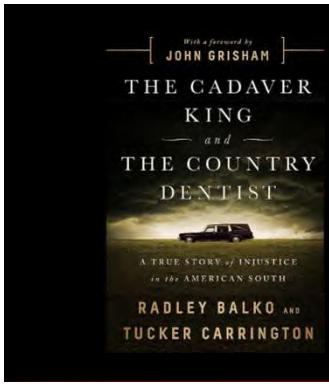
60



- Conviction of Michael Morton
  - 25 years in prison, accused and convicted of killing his wife
  - Last meal 9:21pm, ME estimated that her time of death was no later than 1:30 am based on gastric contents
  - He was the only one with her during that time
- Freed using DNA evidence that was initially ignored
- Long line of leads to the real criminal not investigated

https://www.texasmonthly.com/true-crime/the-innocent-man-part-one/me.

61



COGNITIVE BIAS?

62

WHAT WE LEARNED

1. Cognitive bias is real and can affect decisions
2. Medical examiners are not immune to the negative effects of cognitive bias
3. The definition of "irrelevant non-medical information" is arbitrary and subjective
4. Define forensic pathology "error"
5. Forensic pathology is medicine and context cannot be removed from medicine
6. Linear-sequencial unmasking-expanded (LSU-E), as currently defined, is not implementable in forensic pathology
7. Incorporate practical ways to combat the negative effects of cognitive bias

63

IF YOU REMOVE CONTEXT FROM FORENSIC PATHOLOGY, IT WILL END THE SPECIALTY OF FORENSIC PATHOLOGY

64

DON'T DENY REALITY FOR THE SAKE OF OBJECTIVITY

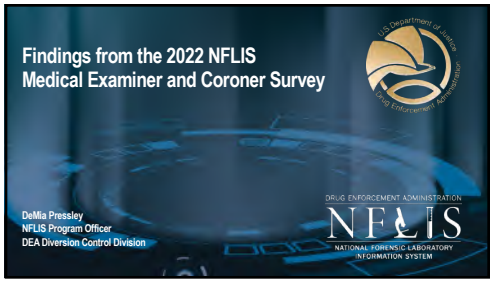
Charles Hirsch, MD
Former Chief Medical Examiner, NYC

65

QUESTIONS?

Paul.uribe@fortbendcountytx.gov
Doc@dmhforensics.com

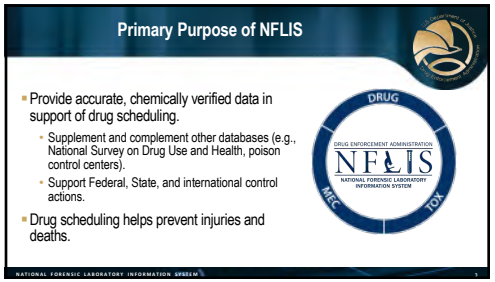
66


Findings from the 2022 NFLIS
Medical Examiner and Coroner Survey
DeMia Pressley
NFLIS Program Officer
DEA Diversion Control Division
DRUG ENFORCEMENT ADMINISTRATION
NFLIS
NATIONAL FORENSIC LABORATORY
INFORMATION SYSTEM

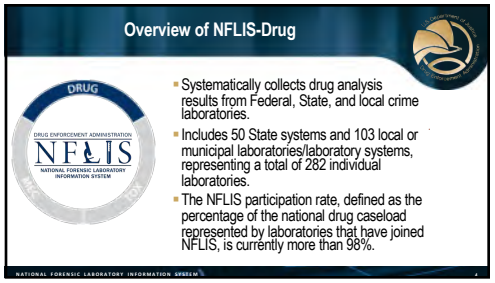
1


Objectives
Briefly describe the Drug Enforcement Administration's (DEA's) primary drug surveillance program—the National Forensic Laboratory Information System (NFLIS).
Present results from the NFLIS-MEC 2022 Survey, which provides information about medical examiner and coroner offices (MECs) and their practices related to death investigations and toxicology testing.
DRUG
NFLIS
MEC
TOX
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

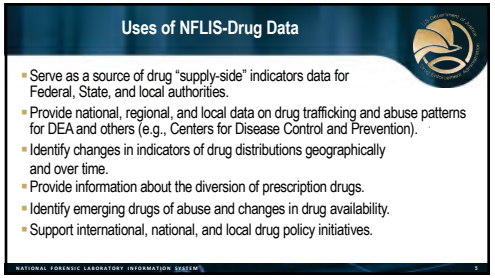
2


Primary Purpose of NFLIS
Provide accurate, chemically verified data in support of drug scheduling.
Supplement and complement other databases (e.g., National Survey on Drug Use and Health, poison control centers).
Support Federal, State, and international control actions.
Drug scheduling helps prevent injuries and deaths.
DRUG
NFLIS
MEC
TOX
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

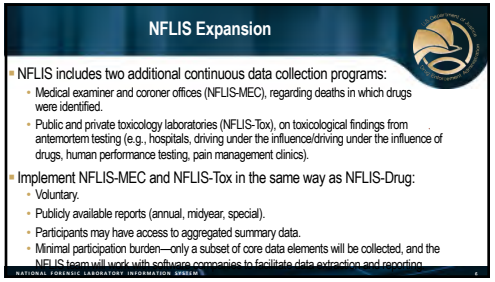
3


Overview of NFLIS-Drug
DRUG
DRUG ENFORCEMENT ADMINISTRATION
NFLIS
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM
Systematically collects drug analysis results from Federal, State, and local crime laboratories.
Includes 50 State systems and 103 local or municipal laboratories/laboratory systems, representing a total of 282 individual laboratories.
The NFLIS participation rate, defined as the percentage of the national drug caseload represented by laboratories that have joined NFLIS, is currently more than 98%.
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

4


Uses of NFLIS-Drug Data
Serve as a source of drug "supply-side" indicators data for Federal, State, and local authorities.
Provide national, regional, and local data on drug trafficking and abuse patterns for DEA and others (e.g., Centers for Disease Control and Prevention).
Identify changes in indicators of drug distributions geographically and over time.
Provide information about the diversion of prescription drugs.
Identify emerging drugs of abuse and changes in drug availability.
Support international, national, and local drug policy initiatives.
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

5


NFLIS Expansion
NFLIS includes two additional continuous data collection programs:
Medical examiner and coroner offices (NFLIS-MEC), regarding deaths in which drugs were identified.
Public and private toxicology laboratories (NFLIS-Tox), on toxicological findings from antemortem testing (e.g., hospitals, driving under the influence/driving under the influence of drugs, human performance testing, pain management clinics).
Implement NFLIS-MEC and NFLIS-Tox in the same way as NFLIS-Drug:
Voluntary.
Publicly available reports (annual, midyear, special).
Participants may have access to aggregated summary data.
Minimal participation burden—only a subset of core data elements will be collected, and the
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

6

National Importance of NFLIS-MEC

- NFLIS-MEC enhances DEA's ability to identify new and emerging substances that are a threat to public health.
  - It is crucial to know all the specific drugs identified in all death investigations, not just those substances to which a cause of death is attributed.
- NFLIS-MEC data will directly inform DEA's drug scheduling actions.

NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM 7

7

NFLIS-MEC 2022 Survey

To develop profiles of each MEC for the NFLIS-MEC program, DEA fielded a national survey (October 2, 2022–March 31, 2023).

- Conducted using multiple modes (web, mail, telephone).
- Focused on caseload statistics, toxicology requesting practices, ability to collect and report data elements, and resource needs.
- Included a multi-tool keychain with the NFLIS logo in the survey packets.
- Statistics are always aggregated; individual survey results are not shared.

NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM 8

8

NFLIS-MEC Survey Response Rates

NFLIS-MEC 2017 Survey

- *N* = 2,128 eligible MECs
- 46.5% completed a full survey
- 61.1% provided responses to critical items related to caseload

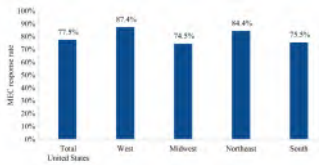
NFLIS-MEC 2022 Survey

- *N* = 2,071 eligible MECs
- 60.9% completed a full survey
- 77.5% provided responses to critical items related to caseload and toxicology testing services offered

Sources: NFLIS-MEC 2017 Survey, NFLIS-MEC 2022 Survey.

9

Full Response Rate



Source: NFLIS-MEC 2022 Survey.

10

Caseload

Jurisdiction Size	Cases Referred		Cases Accepted	
	Number	Percentage	Number	Percentage
Large (250,000 or more)	1,083,905	75.2	449,503	63.9
Medium (25,000 to 249,999)	290,614	20.2	208,154	29.6
Small (fewer than 25,000)	66,061	4.6	45,392	6.5
Total[1,2,3]	**1,440,580**	**100**	**703,049**	**100.0**

[1] Respondents with unknown number of cases referred or cases accepted are excluded.
[2] Among MECs that provided a valid response to Question 10 (referred cases), 40% indicated the number provided was an estimate.
[3] Among MECs that provided a valid response to Question 11 (accepted cases), 42% indicated the number provided was an estimate.
Source: NFLIS-MEC 2022 Survey.

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Investigation Type

Type of Inquiry	Average Number of Accepted Cases Receiving the Procedure	Median Number of Accepted Cases Receiving the Procedure
Death scene investigation	272	80
Toxicology analysis	209	30
Autopsy performed	161	20
External examination only	139	27
Review of medical records only	106	13

Note: For some respondents, the numbers of cases receiving certain inquiries exceeded the total number of accepted cases as reported by that MEC. This table includes information from MECs that estimated their caseload responses.
Source: NFLIS-MEC 2022 Survey.

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Overdose Cases

	Total		West		Midwest		Northeast		South	
Manner of Death	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Accident	92,399	88.0	22,377	91.4	20,126	89.0	16,732	93.7	33,164	82.9
Suicide	5,520	5.3	1,525	6.2	1,338	5.9	642	3.6	2,023	5.1
Homicide	1,216	1.2	218	0.9	239	1.1	102	0.6	657	1.6
Undetermined	5,821	5.5	353	1.4	929	4.1	374	2.1	4,165	10.4
Total[1,2]	104,956	100.0	24,473	100.0	22,624	100.0	17,850	100.0	40,009	100.0

[1] MECs with an unknown number of overdose cases accepted or manner of death were excluded.
[2] Over one-third (36%) of MECs indicated that the provided number of overdose cases was an estimate.
Source: NFLIS-MEC 2022 Survey.

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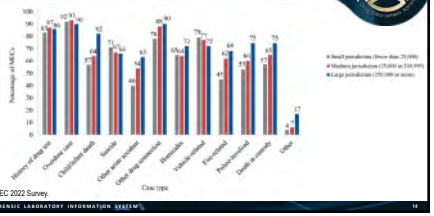
Requests for Toxicology Testing, by Case Type



Source: NFLIS-MEC 2022 Survey.

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Average Turnaround Time

Average Turnaround Time (Days)	Total
Receive toxicology results if autopsy performed[1]	50.8
Receive toxicology results if no autopsy performed[2]	39.1
Finalize cause of death if autopsy performed[3]	58.0
Finalize cause of death if no autopsy performed[4]	20.4

[1] MECs with unknown turnaround time to receive toxicology results if autopsy performed were excluded. Among MECs providing valid responses, 76% indicated the number provided was an estimate.
[2] MECs with unknown turnaround time to receive toxicology results if no autopsy performed were excluded. MECs providing valid responses, 68% indicated the number provided was an estimate.
[3] MECs with unknown turnaround time to finalize cause of death if autopsy performed were excluded. Among MECs providing valid responses, 72% indicated the number provided was an estimate.
[4] MECs with unknown turnaround time to finalize cause of death if no autopsy performed were excluded. Among MECs providing valid responses, 67% indicated the number provided was an estimate.
Source: NFLIS-MEC 2022 Survey.

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Request for Toxicology Testing

≤50%	51%–75%		≥76%
Anticonvulsants	Antidepressants	Emerging synthetic opioids	Alcohol
Inhalants or volatiles	Antipsychotics	Fentanyl-related compounds	Amphetamines/methamphetamines
Over-the-counter medications	Barbiturates	**Gabapentin**	Cocaine
Piperazines	Benzodiazepines	Muscle relaxants	**Fentanyl**
Synthetic cannabinoids	Buprenorphine	Phencyclidine (PCP)	**Heroin**
Synthetic cathinones	Designer benzodiazepines	**Phenethylamines**	**Marijuana/THC**
Z-drugs			Opiates or opioids other than heroin and fentanyl

Note: Bold text denotes substances that were reported as being tested for more frequently in the NFLIS-MEC 2022 Survey than reported in the NFLIS-MEC 2017 Survey.
Source: NFLIS-MEC 2022 Survey.

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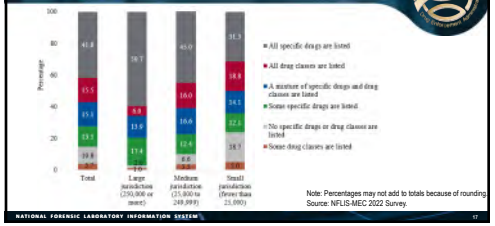
Death Certificate Listing Practices of MECs, by Jurisdiction Size



Note: Percentages may not add to totals because of rounding.
Source: NFLIS-MEC 2022 Survey.

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Conclusions

- NFLIS surveys eligible participants in all three NFLIS data collections every three to five years to maintain entity profiles.
- Highlights of recent program enhancements include
  - ability to query and create built-in visualizations of data through the NFLIS **Public** Data Query System, and
  - a collaboration with the DEA Synth-Opioids forum, which has over 600 participants.

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Links

https://www.nflis.deadiversion.usdoj.gov

https://synthopioids.nflis.deadiversion.usdoj.gov

DEA Synth-Opioids
Real-Time Communication Network

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NFLIS and RTI Contact Information

NFLIS

- DeMia P. Pressley, DEA Program Officer
  Drug Enforcement Administration
  Diversion Control Division
  Email: NFLIS@dea.gov

DRUG ENFORCEMENT ADMINISTRATION
NFLIS
NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

RTI International

- Hope Smiley-McDonald, RTI Project Director
  RTI International (Contractor)
  Email: DEANFLIS@rti.org

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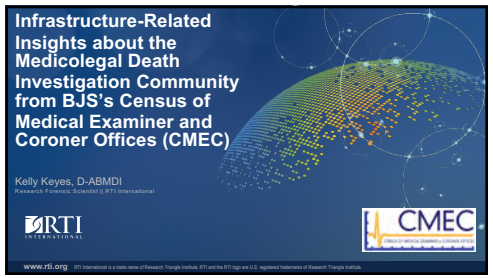
Infrastructure-Related Insights about the Medicolegal Death Investigation Community from BJS's Census of Medical Examiner and Coroner Offices (CMEC)
Kelly Keyes, D-ABMDI
Research Forensic Scientist | RTI International
RTI INTERNATIONAL
CMEC
www.rti.org

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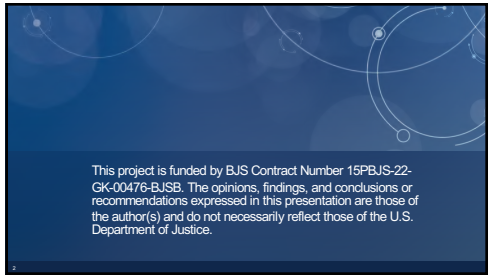
This project is funded by BJS Contract Number 15PBJS-22-GK-00476-BJSB. The opinions, findings, and conclusions or recommendations expressed in this presentation are those of the author(s) and do not necessarily reflect those of the U.S. Department of Justice.
2

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3

3


2018 CMEC Overview
CMEC

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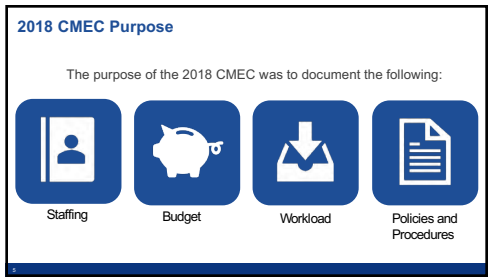
2018 CMEC Purpose
The purpose of the 2018 CMEC was to document the following:
Staffing
Budget
Workload
Policies and Procedures

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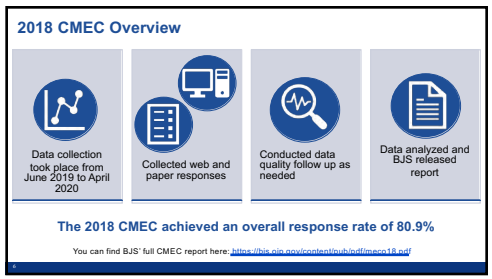
2018 CMEC Overview
Data collection took place from June 2019 to April 2020
Collected web and paper responses
Conducted data quality follow up as needed
Data analyzed and BJS released report
The 2018 CMEC achieved an overall response rate of 80.9%
You can find BJS' full CMEC report here: https://bjs.ojp.gov/content/pub/pdf/meco18.pdf

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2018 CMEC Data Points

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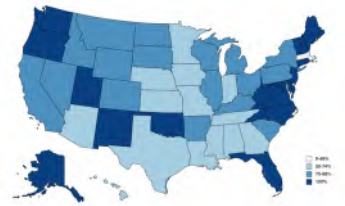
State response rates, 2018 CMEC



Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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Reported budget values of MECs, by census region, 2018

Region	Median Value	Mean Value
Overall	$68,000	$775,000
Midwest	$56,224	$359,772
Northeast	$271,653	$1,936,598
South	$50,000	$772,881
West	$151,629	$1,659,302

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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Reported minimum and maximum starting salaries, by job category, 2018

Job Category	Starting Salary Minimum	Starting Salary Maximum
Autopsy Pathologists	$12,000	$450,000
Coroners/Non-physicians	$10,459	$330,000
Death Investigators	$10,200	$350,000
Forensic Toxicologists	$12,590	$244,393

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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Number of offices reporting on who performs which job function(s), by job category, 2018

*Offices could select more than one option for each function

Job Category	Performs death scene investigations	Determines which cases are accepted	Determines which cases will be sent for autopsy
Autopsy Pathologists	54	148	263
Coroners/Non-physicians	878	919	930
Death Investigators	706	463	352
Other Internal Staff	37	59	53
Not Performed in Office	86	72	58

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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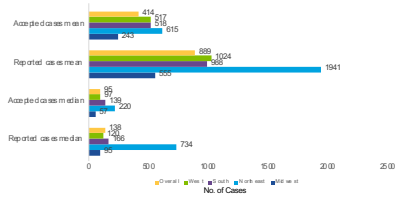
Median and Mean Number of Cases Referred to and Accepted by MECs, by Census Region



Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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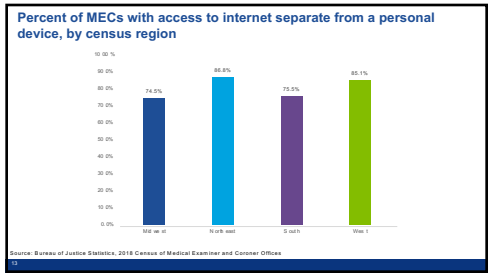
Percent of MECs with access to internet separate from a personal device, by census region
74.6%
86.8%
75.5%
85.1%
Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices

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Upcoming 2023 CMEC Overview
CMEC

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Upcoming Milestones
2023-2024
2024
2024
2025
Raise awareness of upcoming CMEC
Launch 2023 CMEC in Spring-Summer
Data collection/ data quality follow up
Begin disseminating findings to public

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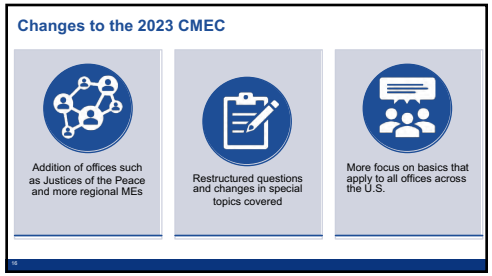
Changes to the 2023 CMEC
Addition of offices such as Justices of the Peace and more regional MEs
Restructured questions and changes in special topics covered
More focus on basics that apply to all offices across the U.S.

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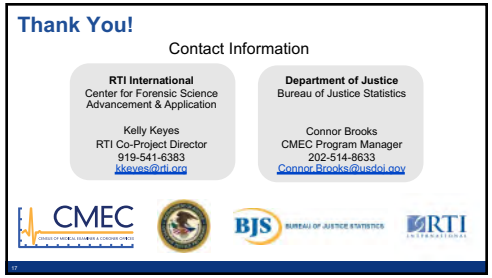
Thank You!
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