

NAME 2018

Annual Meeting Program

October 12 – 16, 2018

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Hilton West Palm Beach

West Palm Beach, FL



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NOTES

Welcome to the NAME 2018 Meeting!

Dear Colleagues and Friends,

Welcome to the National Association of Medical Examiners 2018 Annual Meeting. The NAME Annual Meeting provides an international forum for discussion of a broad range of issues pertaining to forensic pathology and death investigation. This year we have much to discuss and a wonderful host city to enjoy.

Meeting Highlights

The 2018 Annual Meeting will be held from Friday, October 12 through Tuesday, October 16, 2018 at the Hilton West Palm Beach.

Our meeting will feature presentations and posters that cover oceans of topics.

The NAME Business Meeting will be held at the Hilton on Monday morning (October 15) at 8:00am before the scientific sessions begin for the day. The business meeting will include discussion of matters of interest to all NAME members; we urge you to attend so that you may contribute your voice and vote to the decisions made by NAME.

The advance program and other information are available on NAME's website at <https://www.thename.org/name-2018>.

Special Events

Friday evening (October 12) will begin the social activities. Please help us welcome all the international attendees during the international attendees' reception. Following this will be our annual Friday evening welcome reception and dinner at the Hilton.

On Saturday (October 13) early evening there will be a resident and fellow reception after the scientific sessions. This will precede a NAME Foundation Fundraiser at 8:00pm on *Murder, Mayhem, and Mystery* presented by Dr. Chris Milroy.

The Rigor Run/Dead Man's Walk will take place early Sunday (October 14) morning. The Cadaver Open Golf Tournament will be held Sunday afternoon following the morning scientific sessions.

Monday (October 15) will begin with the Learn to Lead, Rise, and Shine from the Chiefs Breakfast. The Femme Fatale Luncheon will also take place on Monday.

The NAME Luncheon and Awards Ceremony will take place at the hotel on Tuesday (October 16). During the luncheon Dr. Jeffrey Jentzen will be presented with the Milton Helpem Laureate Award.

Take advantage of the 8th annual NAME Foundation Silent Auction located adjacent the registration booth. A wide variety of fabulous items available for bidding Saturday, October 13 – Monday, October 15. The NAME Foundation will once again be hosting "Yoga by Donation". This year yoga is scheduled from 5:00pm-6:00pm both Sunday, October 14th and Monday, October 15th.

Special Acknowledgements

We gratefully acknowledge all who have provided input and effort into the planning and implementation of the meeting, especially the Members and Chair of the Education, Program and Publications Subcommittee. Thank you to our speakers for their contributions to the program and to our colleagues who have been appointed to moderate sessions. We would not be here without the expertise of our Executive Director, Denise McNally. In particular, please thank Tara Sneathen and Denise McNally when you see them.

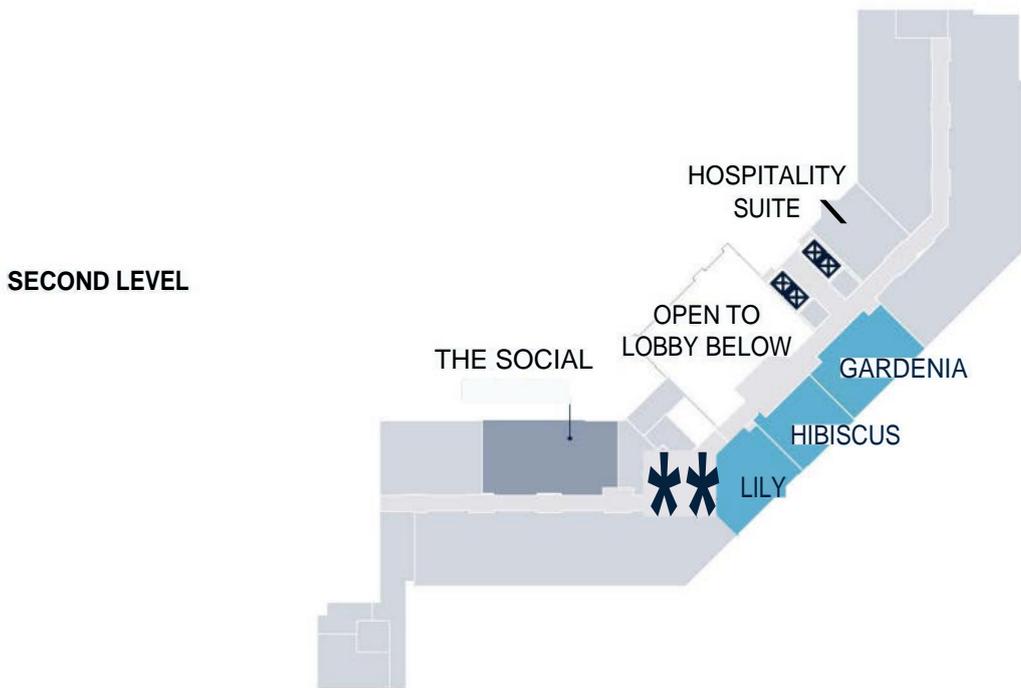
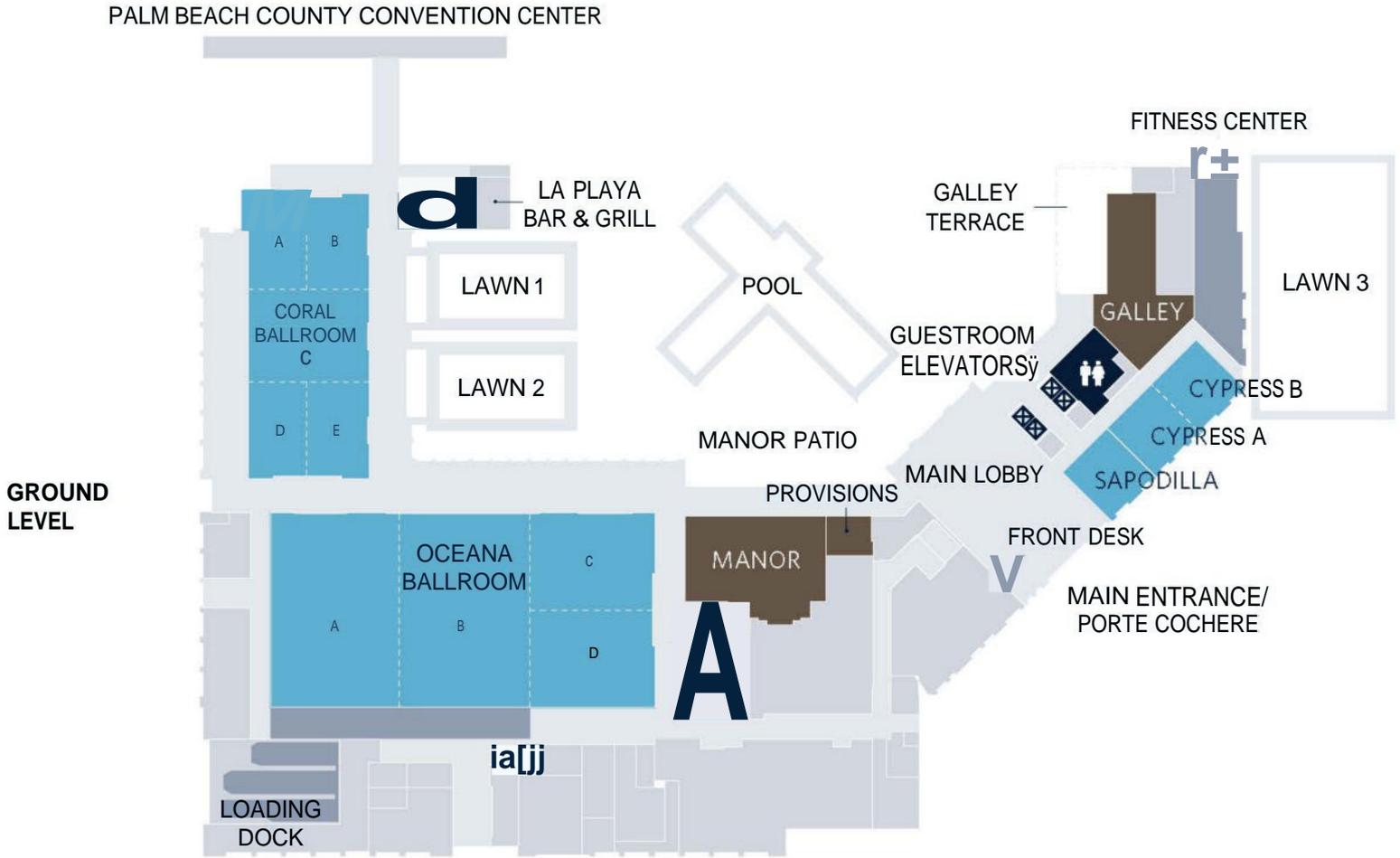
Finally, the leadership and members of NAME acknowledge the gracious support of vendors and sponsors, without whom the meeting would be impossible.

We hope that the scientific program organized by the Program Committee will meet your highest expectations. The leadership of NAME asks all members to guarantee future successful meetings and the overall success of NAME by actively participating in the organization by joining one of our many committees and by completing the online meeting survey that will be sent to all participants at the end of the meeting. The program committee carefully considers this feedback, and vets all comments.

We welcome both our established and new colleagues and look forward to your active participation, which is essential to the success of this meeting. We hope that our new colleagues will consider joining NAME to take advantage of the year-round interactions that our current members enjoy.

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NOTES

MedChi

The Maryland State Medical Society



CME Accreditation Statement: This activity (“National Association of Medical Examiners 2018 Annual Meeting”) has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of MedChi, The Maryland State Medical Society and the National Association of Medical Examiners (NAME). MedChi is accredited by the ACCME to provide continuing medical education for physicians.

MedChi designates this “live” educational activity (“NAME 2018 Annual Meeting”) for a maximum of 32.25 *AMA PRA Category 1 Credit(s)*[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Educational Objective/Target Audience

The objective of the NAME 2018 Annual Meeting is to increase basic and applied pathology knowledge, focusing on autopsy and forensic pathology. The NAME 2018 Annual Meeting is designed to meet the participants’ education needs in the physician competency area of Medical Knowledge, as defined by the Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS), and to support participants’ lifelong learning towards a goal of promoting patient safety and improving patient care and is specifically targeted to forensic pathologists, medical examiners, coroners, death investigators, forensic administrators, pathology assistants, laboratory personnel engaged in forensics, and forensic scientists.

At the completion of the NAME 2018 Annual Meeting, participants should be able to:

1. discuss medico-legal death investigation protocols;
2. describe regulations and competencies for medical examiners;
3. discuss the forensic investigation of accident- and trauma-related death;
4. discuss forensic science approaches to investigation of domestic violence and homicide; and
5. discuss forensic science approaches to sudden death in children and adult populations.

Disclosure of Financial Relationships and Resolution of Conflicts of Interest:

In order to ensure balance, independence, objectivity and scientific rigor in all its educational activities, and in accordance with ACCME Standards, MedChi requires that all individuals in a position to influence and/or control the content of MedChi CME activities disclose to MedChi and subsequently to learners whether they do or do not have any relevant financial relationships with proprietary entities producing health care goods or services that are discussed in CME activities. Faculty are asked to use generic names in any discussion of therapeutic options, to base patient care recommendations on scientific evidence and to base information regarding commercial products/services on scientific methods generally accepted by the medical community. All MedChi CME activities are evaluated by participants for the presence of any commercial bias and thus input is used to subsequent CME planning decisions. The primary purpose of this “live” CME activity is educational and the comments, opinions, and/or recommendations expressed by the faculty or authors are their own and not those of MedChi or NAME.

Planning Committee Disclosures: The Education, Program and Publications (EPP) Planning Committee members and staff of this CME activity have no relevant financial relationships with commercial interest to disclose.

ADDITIONAL INFORMATION

How to Apply for CME Credit:

CME application forms will be available online at <https://www.thename.org/2018-cme> by October 12, 2018 and must be submitted no later than December 31, 2018. Should you have questions about your CME application contact Tara Snethen, Meetings Manager (phone 240-498-2918; email: tsnethen@thename.org)

NOTES

NAME 2018 MEETING PROGRAM

THURSDAY, OCTOBER 11, 2018

COMMITTEE MEETING [NOT CME]:

8:00 AM – 5:00 PM Executive Committee Meeting (Invitation Only)
Hibiscus, Second Level

FRIDAY, OCTOBER 12, 2018

GENERAL INFORMATION [NOT CME]:

10:00 AM – 4:00 PM Pre-Registration (Exhibitors & Attendees)
Oceana Foyer, Ground Level

1:00 PM – 4:00 PM Installation of Exhibits
Oceana Ballroom, Ground Level

5:30 PM – 6:30 PM International Attendee Reception
The Social, Second Level
Sponsored by MTF Biologics

5:30 PM – 9:00 PM Grand Opening of Exhibits; Welcome Reception and Dinner (Registrants and Ticket Holders Only)
Oceana Ballroom, Ground Level

COMMITTEE MEETINGS [NOT CME]:

6:45 AM – 8:00 AM Foundation and Board of Directors Meeting & Continental Breakfast
Sapodilla, Ground Level

7:00 AM – 8:00 AM Foundation Meeting
Cypress, Ground Level

8:00 AM – 12:00 PM Board of Directors Meeting
Cypress, Ground Level

12:00 PM – 1:00 PM Board of Directors Lunch
Sapodilla, Ground Level

12:30 PM – 4:30 PM Strategic Planning Committee Meeting
Gardenia, Second Level

3:00 PM – 5:00 PM Ad Hoc Meeting on Organ and Tissue Procurement
Cypress, Ground Level

4:30 PM – 5:30 PM Ad Hoc Meeting on Protocols for Interagency Interactions in Mass Fatality Incidents
Gardenia, Second Level

4:30 PM – 5:00 PM NAME Foundation Business Meeting
Sapodilla, Ground Level

SATURDAY, OCTOBER 13, 2018

****Indicates the following:***

*John Smialek Best Resident Paper/Poster Competition
**Mary Fran Ernst Best Affiliate Paper/Poster Competition
***Susan P. Baker Public Health Impact Award
****Best Student Paper/Poster Competition

GENERAL INFORMATION:

6:45 AM – 8:00 AM Buffet Breakfast (Registrants and Ticket Holders Only) [NOT CME]
Oceana Ballroom, Ground Level

8:00 AM – 4:00 PM Exhibits [NOT CME]
Oceana Ballroom, Ground Level

7:00 AM – 5:00 PM Registration [NOT CME]
Oceana Foyer, Ground Level

8:00 AM – 5:00 PM Posters
Oceana Foyer, Ground Level

5:20 PM – 6:20 PM Resident/Fellow Reception [NOT CME]
Event Lawns, Ground Level
Sponsored by our Gold Level Corporate Partner, NMS Labs

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8:00 PM – 10:00 PM NAME FOUNDATION OUTREACH FUNDRAISER: “Murder, Mayhem and Mystery”
[NOT CME]
Coral Ballroom, Ground Level

COMMITTEE MEETINGS [NOT CME]:

7:00 AM – 8:00 AM International Relations Committee Meeting
Cypress, Ground Level

7:00 AM – 8:00 AM Ethics Committee Meeting
Hibiscus, Second Level

12:30 PM – 1:30 PM Past President’s Committee Meeting and Lunch
Sapodilla, Ground Level

12:30 PM – 1:30 PM Journal Editorial Board Meeting
Gardenia, Second Level

6:00 PM – 8:00 PM Forensic Pathology Training Subcommittee Meeting
Cypress, Ground Level

PROGRAM INFORMATION:

8:00 AM – 8:15 AM Welcome and Introduction [NOT CME]
Coral Ballroom, Ground Level

8:15 AM – 10:00 AM SESSION 1: ANCHORS AWAY
Moderators: Lori A. Proe, DO, University of New Mexico, Albuquerque, NM, United States of America and Reade A. Quinton, MD, Southwestern Institute of Forensic Sciences, Dallas, TX, United States of America
Coral Ballroom, Ground Level

8:15 AM – 8:30 AM 1.1 Fatal Drug Overdoses Involving Carfentanyl: A Series Of 430 Cases at the Palm Beach County Medical Examiner Office, 2016-2018
Michael D. Bell, MD, Palm Beach County Medical Examiner Office, West Palm Beach, Florida, United States of America

8:30 AM – 8:45 AM 1.2 Spleen Blood as an Alternative Specimen to Peripheral Blood for Postmortem Toxicological Analysis
**Ashley Leigh Lukefahr, MD, The University of Arizona - Tucson, Tucson, Arizona, United States of America*

8:45 AM – 9:00 AM 1.3 Forensic Toxicological Analysis of Deaths Due to Drug Overdose A Descriptive Retrospective Study of 1100 autopsies Performed at The Cook County Medical Examiner's Office from January 1st to December 31st, 2017
****Dhammi Luwis Hewa, MD Forensic Medicine, Office of the Medical Examiner, County of Cook, Chicago, Illinois, United States of America*

9:00 AM – 9:15 AM 1.4 Protocol for "Real-Time" Surveillance of Drug Overdose Deaths in King County, Washington
****Nicole Yarid, MD, King County Medical Examiner's Office, Seattle, Washington, United States of America*

9:15 AM – 9:30 AM 1.5 An Empirical Look at Drugs Detected in Non-Autopsied, Presumed Natural Deaths
*****Richard Seeber, II, BS, The University of Alabama at Birmingham, Birmingham, Alabama, United States of America*

9:30 AM – 9:40 AM 1.6 Characteristics of Rapid Overdose Deaths, State Unintentional Overdose Reporting System, July 2016-June 2017
Mbabazi Kariisa, PhD, Centers for Disease Control and Prevention, NCIPC/DUIP, Atlanta, Georgia, United States of America

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9:40 AM – 9:50 AM	1.7 Use of Mobile Technology for Real-Time Access to Overdose Data - Public Health and Pharmacology Implications <i>***Karl E. Williams, MD, MPH, Office of the Medical Examiner of Allegheny County, Pittsburgh, Pennsylvania, United States of America</i>
9:50 AM – 10:00 AM	1.8 Discerning Drug Mortality Patterns in a Large Database of Toxicology Results <i>Carl J. Schmidt, MD, MPH, University of Michigan / Wayne County Medical Examiner, Detroit, Michigan, United States of America</i>
10:00 AM – 10:30 PM	VISIT EXHIBITS [NOT CME]
10:00 AM – 10:30 PM	BREAK [NOT CME] <i>Sponsored by our Gold Level Corporate Partner, NMS Labs</i>
10:00 AM – 10:30 PM	VISIT POSTERS
10:30 AM – 12:30 PM	SESSION 2: HANG 10 WITH PUBLIC HEALTH Moderators: Daniel Schultz, MD, Hillsborough County Medical Examiner, Tampa, FL, United States of America and Jay L. Stahl-Herz, MD, New York City Office of Chief Medical Examiner, New York, NY, United States of America <i>Coral Ballroom, Ground Level</i>
10:30 AM – 10:45 AM	2.1 National Association of Medical Examiners Position Paper: Recommendations for the Investigation and Certification of Deaths in People with Epilepsy <i>Elizabeth A Bundock, MD PhD, Office of the Chief Medical Examiner, Burlington, Vermont, United States of America</i>
10:45 AM – 11:00 AM	2.2 Correctly Identifying Deaths due to Drug Toxicity without a Forensic Autopsy <i>Daniel W. Dye, MD, UAB; Jefferson County Coroner/Medical Examiner Office, Birmingham, Alabama, United States of America</i>
11:00 AM – 11:30 AM	2.3 Death Certification Errors and the Effect on Mortality Statistics <i>**Lauri McGivern, MPH, F-ABMDI, Office of the Chief Medical Examiner, Burlington, Vermont, United States of America</i>
11:30 AM – 11:45 AM	2.4 An Assessment of Protocols, Practices, and Needs for Sudden Unexpected Infant Death Cause-of-Death Determinations-2014 <i>Carri Cottengim, MA, Centers for Disease Control and Prevention, Atlanta, Georgia, United States of America</i>
11:45 AM – 12:00 PM	2.5 Evaluation of Autopsy Findings, Investigative Information and the Determination of Betahydroxybutyrate (BHB) Concentrations in Certifying Deaths from Cold Exposure <i>*Michael D Eckhardt, MD, Cook County Medical Examiner's Office, Chicago, Illinois, United States of America</i>
12:00 PM – 12:15 PM	2.6 Suicidal Carbon Monoxide Poisoning by Formic and Sulfuric Acid <i>****Kasey Kreutz, University of Texas Southwestern, Dallas, Texas, United States of America</i>
12:15 PM – 12:30 PM	2.7 Death in a Carbon Dioxide Therapy Bath <i>*Julian Samuel, MD, Icahn School of Medicine at Mount Sinai/Mount Sinai St. Luke's-Mount Sinai West, New York, New York, United States of America</i>
12:30 PM – 1:30 PM	LUNCH (ON YOUR OWN) [NOT CME]
12:30 PM – 1:30 PM	VIEW POSTERS P1 – P5; P7 – P36

- 1:30 PM – 3:30 PM** **SESSION 3 (Part 1): SURFIN' UP MORE AWARDS PRESENTATIONS**
Moderators: Giancarlo Di Vella, MD, PhD, University of Torino, Torino, Italy
Coral Ballroom, Ground Level
- 1:30 PM – 1:45 PM 3.1 Best Practices for Talking about Suicide with Media and Families
Daniel J. Reidenberg, Psy.D., Suicide Awareness Voices of Education, Bloomington, Minnesota, United States of America
- 1:45 PM – 2:00 PM 3.2 Utility of a Handheld Blood Ketone Meter as a Postmortem Indicator of Diabetic Ketoacidosis
****Richard Seeber, II, BS, The University of Alabama at Birmingham, Birmingham, Alabama, United States of America*
- 2:00 PM – 2:15 PM 3.3 Application of the Drowning Index to Opioid and Multidrug Intoxication Deaths: A Retrospective Analysis
****Madeleine P. Opsahl, BA, and Lindsey T. Ellis, BS, University of Missouri, Columbia, Missouri, United States of America*
- 2:15 PM – 2:30 PM 3.4 U-Shaped Pillows and Sleep Related Deaths: 2004-2015
Alexa Baron Erck Lambert, MPH, DB Consulting Group, Inc., contractor for Centers for Disease Control and Prevention, New Orleans, Louisiana, United States of America
- 2:30 PM – 2:45 PM 3.5 Is DNA Banking a Viable and Successful Support Program for Families of Sudden Child Death?
Heather A Maher, MSFS, SUDC Foundation, Cedar Grove, New Jersey, United States of America
- 2:45 PM – 3:30 PM 3.6 A New Path Forward: The Use of Social Media Platforms by Forensic Specialists for Education, Public Outreach and Epidemiological Considerations
****Darin L Wolfe, MD, Indiana Forensic & Surgical Pathology, LLC, Indianapolis, Indiana, United States of America*
- 3:30 PM – 4:00 PM VISIT EXHIBITS [NOT CME]
- 3:30 PM – 4:00 PM BREAK [NOT CME]
Sponsored by MTF Biologics
- 3:30 PM – 4:00 PM VISIT POSTERS
- 4:00 PM – 5:00 PM** **SESSION 3 (Part 2): SURFIN' UP MORE AWARDS PRESENTATIONS**
Moderators: Giancarlo Di Vella, MD, PhD, University of Torino, Torino, Italy
Coral Ballroom, Ground Level
- 4:00 PM – 4:15 PM 3.7 Examining Youth Street Gangs: A Rising Safety Problem Confronting Medical Examiners/Coroners
****Cliff Akiyama, MPH, MA, Akiyama and Associates, LLC, Philadelphia, Pennsylvania, United States of America*
- 4:15 PM – 4:30 PM 3.8 Opioid-Related Deaths in Eastern Ontario from 2011 to 2016
****Jacqueline Louise Parai, MD, MSc, FRCPC, Ontario Forensic Pathology Services, Ottawa, Ontario, Canada*
- 4:30 PM – 4:45 PM 3.9 Bound and Burned in Detroit
**Sarah Avedschmidt, M.D., University of Michigan, Detroit, Michigan, United States of America*
- 4:45 PM – 5:00 PM Questions

SUNDAY, OCTOBER 14, 2018

GENERAL INFORMATION:

6:00 AM – 8:00 AM	Rigor Run/Walk (Optional) [NOT CME] <i>Sponsored by The Denton Family</i>
6:45 AM – 8:00 AM	Buffet Breakfast (Registrants and Ticket Holders Only) [NOT CME] <i>Oceana Ballroom, Ground Level</i>
8:00 AM – 1:00 PM	Exhibits [NOT CME] <i>Oceana Ballroom, Ground Level</i>
7:00 AM – 5:00 PM	Registration [NOT CME] <i>Oceana Foyer, Ground Level</i>
8:00 AM – 5:00 PM	Posters <i>Oceana Foyer, Ground Level</i>
1:00 PM – 5:00 PM	24 th Annual Cadaver Open Golf Tournament (Optional) [NOT CME] <i>*Additional Payment Required*</i> <i>Sponsored by CryoLife, Inc.</i>
5:00 PM – 6:00 PM	NAME Foundation Yoga by Donation [NOT CME] <i>Gardenia, Second Level</i>

COMMITTEE MEETING [NOT CME]:

12:30 PM – 1:30 PM	SUDP Lunch/Meeting (<i>by invitation only</i>) <i>Sapodilla, Ground Level</i>
4:30 PM – 5:30 PM	NAME Ad hoc Committee on Deaths Involving Drugs – CDC <i>Cypress, Ground Level</i>
5:30 PM – 6:30 PM	Inspection and Accreditation Committee Meeting <i>Cypress, Ground Level</i>
6:30 PM – 10:30 PM	Inspection and Accreditation Training <i>Cypress, Ground Level</i>

PROGRAM INFORMATION:

8:00 AM – 10:00 AM	SESSION 4: GRAINS OF KNOWLEDGE Moderators: Karl E. Williams, MD, Office of the Medical Examiner, Pittsburgh, PA, United States of America and Dennis J. Firchau, MD, Univ of Iowa Hospitals and Clinics, Iowa City, IA, United States of America <i>Coral Ballroom, Ground Level</i>
8:00 AM – 8:15 AM	4.1 If You Want to Save Lives, Start with the Dead: Epidemiologists and Medicolegal Death Investigators Unite to Stop Suicide Using Novel Surveillance Methodology <i>***Kimberly K. Repp, PhD, MPH, Washington County, Aloha, Oregon, United States of America</i>
8:15 AM – 9:00 AM	4.2 Interface Astroglial Scarring, a Pattern of Brain Damage in Blast-Exposed Service Members with Prominent Persistent Behavioral/Neurologic Symptomatology, Including Suicide <i>Daniel P. Perl, MD, Uniformed Services University, Bethesda, Maryland, United States of America</i>
9:00 AM – 9:15 AM	4.3 In Good Hands? Death of a Child due to Intentional Immersion in Hot Water and the Resulting Complications <i>*Julia D. Berry, MD, Baylor University Medical Center, Dallas, Texas, United States of America</i>
9:15 AM – 9:30 AM	4.4 Differentiation between Cranial Trauma and Post Mortem Cranial Expansion in the Skeletonized Remains in Infants and Young Children: A Case Study of an Approximate Two Year Old Male Child <i>William C. Rodriguez, III, PhD, Office of the Chief Medical Examiner, Baltimore, Maryland, United States of America</i>

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9:30 AM – 9:45 AM	4.5 Melatonin Detection in Pediatric Deaths <i>**Laura M. Labay, PhD, NMS Labs, Willow Grove, Pennsylvania, United States of America</i>
9:45 AM – 10:00 AM	4.6 Novel Illicit Opioid Proliferation in Postmortem Investigations: 2017-Q1 2018 Experience <i>Barry K Logan, PhD, NMS Labs, Willow Grove, Pennsylvania, United States of America</i>
10:00 AM – 10:30 PM	VISIT EXHIBITS [NOT CME]
10:00 AM – 10:30 PM	BREAK [NOT CME]
10:00 AM – 10:30 PM	VISIT POSTERS
10:30 AM – 12:30 PM	SESSION 5: NAVIGATING THE WATERS Moderators: Lee Ann "L.A." Grossberg, MD, Forensic Pathology Consultation Services, P.A., Houston, TX, United States of America <i>Coral Ballroom, Ground Level</i>
10:30 AM – 10:45 AM	5.1 Consortium of Forensic Science Organizations Legislative Update <i>Matthew Gamette, MS, Consortium of Forensic Science Organizations, Meridian, Idaho, United States of America</i>
10:45 AM – 11:00 AM	5.2 WITHDRAWN
11:00 AM – 12:30 PM	5.3 Medicolegal Consulting/Private Practice Forensics Workshop <i>Judy Melinek, MD, PathologyExpert Inc., San Francisco, California, United States of America</i>
12:30 PM – 1:30 PM	LUNCH (ON YOUR OWN) [NOT CME]
12:30 PM – 1:30 PM	VIEW POSTERS P6; P37 – P78
1:30 PM – 3:30 PM	SESSION 6 (Part 1): FORENSIC LIFE PRESERVERS Moderators: Dianne Little, MBBS, Gold Coast University Hospital, Southport, Australia and Ljubisa J. Dragovic, MD, Oakland County Medical Examiner's Office, Pontiac, MI, United States of America <i>Coral Ballroom, Ground Level</i>
1:30 PM – 1:45 PM	6.1 Remediation of Forensic Pathologist Shortages in the United States Through J-1 Visa Exemptions <i>M.J. Menendez, JD, OSDOJ, OCDETF, Washington DC, District of Columbia, United States of America</i>
1:45 PM – 2:00 PM	6.2 Federal Interagency Working Group on Medicolegal Death Investigation <i>Margaret Warner, PhD, CDC/National Center for Health Statistics, Hyattsville, Maryland, United States of America</i>
2:00 PM – 2:15 PM	6.3 Navigating the J1 Visa Process: A Canadian's Perspective <i>Anita Rajkumar, MD, Dane County Medical Examiner's Office, McFarland, Wisconsin, United States of America</i>
2:15 PM – 2:45 PM	6.4 Update on Continuous Certification and Impact on Forensic Pathologists <i>Laura D. Knight, MD, Washoe County Regional Medical Examiner's Office, Reno, Nevada, United States of America</i>
2:45 PM – 3:00 PM	6.5 2018 Medicolegal Death Investigation Salary Survey <i>William R. Oliver, MD, Regional Forensic Center, Knoxville, Tennessee, United States of America</i>

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- 3:00 PM – 3:30 PM 6.6 Hosting International Forensic Pathology Scholars
Richard C. Harruff, MD, PhD, King County Medical Examiner's Office, Seattle, Washington, United States of America
- 3:30 PM – 4:00 PM BREAK [NOT CME]
Sponsored by our Gold Level Corporate Partner, NMS Labs
- 3:30 PM – 4:00 PM VISIT POSTERS
- 4:00 PM – 5:00 PM** **SESSION 6 (Part 2): FORENSIC LIFE PRESERVERS**
Moderators: Dianne Little, MBBS, Gold Coast University Hospital, Southport, Australia and Ljubisa J. Dragovic, MD, Oakland County Medical Examiner's Office, Pontiac, MI, United States of America
Coral Ballroom, Ground Level
- 4:00 PM – 4:15 PM 6.7 Are Truncated Autopsy Reports a Useful Tool in Managing Case Turnaround Times? The Use of the "Summary of Autopsy Findings" in a Large Medical Examiner System
****Mindy J. Hull, MD, Office of the Chief Medical Examiner, Commonwealth of Massachusetts, Boston, Massachusetts, United States of America*
- 4:15 PM – 4:45 PM 6.8 After SIDS, SUID, or Undetermined: A Diagnostic Service for Parents and Medical Examiners Wanting to Know More
Richard D Goldstein, MD, Boston Children's Hospital, Boston, Massachusetts, United States of America
- 4:45 PM – 5:00 PM Questions

MONDAY, OCTOBER 15, 2018

GENERAL INFORMATION:

- 6:45 AM – 8:00 AM Buffet Breakfast (Registrants and Ticket Holders Only) [NOT CME]
Oceana Ballroom, Ground Level
- 7:00 AM – 5:00 PM Registration [NOT CME]
Oceana Foyer, Ground Level
- 8:00 AM – 5:00 PM Posters
Oceana Foyer, Ground Level
- 12:30 PM – 1:30 PM Feme Fatale Luncheon (Optional) [NOT CME]
Additional Payment Required
Cypress, Ground Level
- 5:00 PM – 6:00 PM NAME Foundation Yoga by Donation [NOT CME]
Gardenia, Second Level
- 6:30 PM – 8:30 PM Board of Directors Reception (Invitation Only) [NOT CME]
Event Lawns, Ground Level

PROGRAM INFORMATION:

- 7:00 AM – 8:00 AM** **OPTIONAL WORKSHOP 1: LEARN TO LEAD IN FORENSIC PATHOLOGY FROM CHIEF MEDICAL EXAMINERS**
Moderator: Michelle Aurelius, MD, NC Office of the Chief Medical Examiner, Raleigh, North Carolina, United States of America
Cypress, Ground Level
- 7:00 AM – 8:00 AM W1 Learn to Lead in Forensic Pathology From Chief Medical Examiners - Breakfast Workshop
Michelle Aurelius, MD, NC Office of the Chief Medical Examiner, Raleigh, North Carolina, United States of America
- 8:00 AM – 10:00 AM NAME Business Meeting [NOT CME]
Coral Ballroom, Ground Level
- 10:00 AM – 10:15 AM BREAK [NOT CME]

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10:00 AM – 10:15 AM	VISIT POSTERS
10:15 AM – 12:30 PM	SESSION 7: HEARTS OF PALM Moderators: Roger A. Mitchell, MD, District of Columbia Office of the Chief Medical Examiner, Washington, DC, United States of America and Priya Banerjee, MD, Rhode Island Office of State Medical Examiners, Providence, RI, United States of America <i>Coral Ballroom, Ground Level</i>
10:15 AM – 10:45 AM	7.1 Cardiovascular Devices--What's New Under the Skin? <i>Elena R. Ladich, MD, Pathology Consultants of South Broward, Memorial Regional Hospital, Hollywood, Florida, United States of America</i>
10:45 AM – 11:30 AM	7.2 Cardiomyopathies: A Practical Approach to the Evaluation in the Setting of Sudden Cardiac Death <i>Stanley J. Radio, MD, University of Nebraska Medical Center, Omaha, Nebraska, United States of America</i>
11:30 AM – 12:30 PM	7.3 The Mechanism and Investigation of Traumatic Basal Subarachnoid Hemorrhage and Vertebral Artery Injury <i>Christopher Paul Johnson, Dr, BSc, MBChB, MD, FRCPath, Royal Liverpool University Hospital, Liverpool, Merseyside, United Kingdom of Great Britain and Northern Ireland</i>
12:30 PM – 1:30 PM	LUNCH (ON YOUR OWN) [NOT CME]
12:30 PM – 1:30 PM	VIEW POSTERS P79 – P121
1:30 PM – 3:30 PM	SESSION 8: MORE HEARTS FILLED WITH SUNSHINE...AND DNA Moderators: Jennifer L. Hammers, DO, Cyril H. Wecht & Pathology Associates, Pittsburgh, PA, United States of America and Laura Crandall, MA, The SUDC Foundation, Cedar Grove, NJ, United States of America <i>Coral Ballroom, Ground Level</i>
1:30 PM – 1:45 PM	8.1 Pathologic Correlation with Autopsy-Defined Sudden Arrhythmic Death in the San Francisco Postmortem Systematic Investigation of Sudden Cardiac Death (POST SCD) Study <i>Ellen Moffatt, Office of the Chief Medical Examiner, San Francisco, San Francisco, California, United States of America</i>
1:45 PM – 2:00 PM	8.2 DNA Extraction from Diverse Post-Mortem Samples <i>Gregory Webster, MD, MPH, Northwestern University, Chicago, Illinois, United States of America</i>
2:00 PM – 2:15 PM	8.3 Post-mortem Genetic and Polygenic Profiling to Inform Risk to Living Relatives <i>Ali Torkamani, PhD, Scripps Translational Science Institute, La Jolla, California, United States of America</i>
2:15 PM – 3:00 PM	8.4 The Vital Role of Medical Examiners and Autopsy Data in Trauma System Development <i>Gregory A. Schmunk, MD, Polk County Medical Examiner's Office, Des Moines, Iowa, United States of America, Thomas T. Noguchi, MD, Los Angeles County Medical Examiner, Los Angeles, California, United States of America, Edward L. Mazuchowski, MD, PhD, San Antonio Military Medical Center, Ft. Sam Houston, Texas, United States of America, Brian J. Eastridge, MD, University of Texas Health Science Center at San Antonio, San Antonio, Texas, United States of America, and Susan K. Schmunk, CAISS, CSTR, MedPartners, Tampa, Florida, United States of America</i>

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- 3:00 PM – 3:30 PM 8.5 National Institute of Justice's (NIJ) Support for the Medical Examiner/Coroner Community
Danielle L. McLeod-Henning, MFS, National Institute of Justice, Washington, District of Columbia, United States of America
- 3:30 PM – 3:45 PM BREAK [NOT CME]
- 3:30 PM – 3:45 PM VISIT POSTERS
- 3:45 PM – 5:00 PM** **SESSION 9: IT'S 5'O'CLOCK SOMEWHERE**
Moderators: Maneesha Pandey, MBBS, Lucas County Coroner's Office, Toledo, OH, United States of America and Gregory A. Schmunk, MD, Polk County Medical Examiner's Office, Des Moines, Iowa, United States of America
Coral Ballroom, Ground Level
- 3:45 PM – 4:00 PM 9.1 Enhancing Opioid Overdose Surveillance in States
Christine L. Mattson, PhD, MS, Centers for Disease Control and Prevention, Atlanta, Georgia, United States of America
- 4:00 PM – 4:30 PM 9.2 Fatal Mitragynine-Associated Toxicity in Canada: A Case Report and Review of the Literature
Alfredo Eugene Walker, Forensic Pathologist, FRCPath, DMJ (Path), MB.BS, Eastern Ontario Regional Forensic Pathology Unit, Ottawa, Ontario, Canada
- 4:30 PM – 4:45 PM 9.3 Findings from DEA's National Forensic Laboratory Information System (NFLIS) Medical Examiner and Coroner Office Survey
DeMia Pressley, MS, Drug Enforcement Administration, Springfield, Virginia, United States of America
- 4:45 PM – 5:00 PM Questions

TUESDAY, OCTOBER 16, 2018

GENERAL INFORMATION:

- 6:30 AM – 8:00 AM Buffet Breakfast (Registrants and Ticket Holders Only) [NOT CME]
Oceana Ballroom, Ground Level
- 7:00 AM – 5:00 PM Registration [NOT CME]
Oceana Foyer, Ground Level
- 8:00 AM – 12:00 PM Posters
Oceana Foyer, Ground Level

PROGRAM INFORMATION:

- 8:00 AM – 10:00 AM** **SESSION 10: A WHALE OF A TOPIC: MASS DISASTER PREPAREDNESS**
Moderators: Barbara A. Sampson, MD, PhD, Office of Chief Medical Examiner, New York, NY, United States of America
Coral Ballroom, Ground Level
- 8:00 AM – 10:00 AM 10.1 Management of Different Mass Fatality Incidents
Kathryn Pinneri, MD, Montgomery County Forensic Services, Conroe, Texas, United States of America, Joshua D. Stephany, MD, Districts 9 and 25 Medical Examiner's Office, Orlando, Florida, United States of America, Marcella F. Fierro, MD, Fierro Forensics, Henrico, Virginia, United States of America, Mark A. Koponen, MD, University of North Dakota School of Medicine, Grand Forks, North Dakota, United States of America, Joyce L. deJong, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America, and Barbara A. Sampson, MD, PhD, Office of Chief Medical Examiner, New York, New York, United States of America
- 10:00 AM – 10:30 AM BREAK [NOT CME]
- 10:00 AM – 10:30 AM VISIT POSTERS

- 10:30 AM – 12:00 PM** **SESSION 11: SMALL FISH IN A BIG OCEAN**
Moderators: Brian L Peterson, MD, Milwaukee County Medical Examiner's Office, Milwaukee, WI, United States of America and Laura Labay, PhD, NMS Labs, Willow Grove, PA, United States of America
Coral Ballroom, Ground Level
- 10:30 AM – 10:45 AM 11.1 Sudden Death from Head Trauma in Video-recorded Pediatric Short Fall: Subdural Hematoma, Retinal Hemorrhages, and Traumatic Brain Injury
Jane W. Turner, MD, PhD, Virchow Consulting Services, St. Louis, Missouri, United States of America
- 10:45 AM – 11:00 AM 11.2 Classification of Pediatric Suicides
Andrew L. Falzon, MD, New Jersey Office of the State Medical Examiner, Trenton, New Jersey, United States of America
- 11:00 AM – 11:10 AM 11.3 Critical Value Reporting: The Need To Develop Appropriate Communication Channels
Ken Obenson, MBBS, Saint John Regional Hospital - Horizon Health Network, Saint John, New Brunswick, Canada
- 11:10 AM – 11:45 AM 11.4 It Walks Like a Duck, Quacks Like a Duck But It's a Horse: The Process of Second Opinion Expert Consultation, Independent Diagnosis of an Unusual Presentation of Rare Disease Process, and Truth-seeking by Experts in an Adversarial System
Evan Matshes, MD, National Autopsy Assay Group, San Diego, California, United States of America
- 11:45 AM – 12:00 PM 11.5 Duty to Warn: Implications for Medical Examiners in Young Sudden Death Cases
Heather MacLeod, Independent Contractor, Elmhurst, Illinois, United States of America
- 12:00 PM – 2:00 PM** **NAME Luncheon & Awards Presentations (Registrants and Ticket Holders Only)**
[NOT CME]
Milton Helpern Laureate Award Lecture: Profiles in Courage
Jeffrey M. Jentzen, MD will receive the Milton Helpern Laureate Award (see Page 38 for Details)
Oceana Ballroom AB, Ground Level
- 2:00 PM – 5:00 PM** **SESSION 12: MISCELLANEOUS PEARLS**
Moderators: M.G.F. Gilliland, MD, Brody SOM at East Carolina University, Greenville, NC, United States of America and Marianne E. Beynon, MD, Baylor College of Medicine, Houston, TX, United States of America
Coral Ballroom, Ground Level
- 2:00 PM – 2:20 PM 12.1 A River Runs Through It: Bridge Jumpers in Spokane County, Washington
Sally S. Aiken, MD, Spokane County Medical Examiner's Office, Spokane, Washington, United States of America
- 2:20 PM – 2:40 PM 12.2 Implementing Autopsy Recommendations from the Sudden Death in the Young (SDY) Case Registry
Heather MacLeod, MS, SDY Case Registry Data Coordinating Center, Elmhurst, Illinois, United States of America
- 2:40 PM – 2:55 PM 12.3 Unraveling a Triple Homicide Dismemberment
Jennifer L. Hammers, DO, Cyril H. Wecht & Pathology Associates, Pittsburgh, Pennsylvania, United States of America
- 2:55 PM – 3:10 PM 12.4 Not So Straightforward Hanging Deaths
Theodore T. Brown, MD, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America

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- 3:10 PM – 3:25 PM 12.5 Preventing Consumer Product-Related Deaths: The Vital Role of Medical Examiners
Yolanda Nash, BA, U.S. Consumer Product Safety Commission, Bethesda, Maryland, United States of America
- 3:25 PM – 3:40 PM 12.6 Equine Fatalities: Classifying Mechanisms of Injury and Use of Occult Hoof/Impact Pattern to Assist In Injury Classification.
Kendall Von Crowns, MD, Travis County Meducal Examinaers Office, Austin, Texas, United States of America
- 3:40 PM – 3:55 PM 12.7 The Utility of Post Mortem CT Angiography in Forensic Practice
Linda Iles, MB BS, FRCPA, DMJ (Path), Victorian Institute of Forensic Medicine, Southbank, Victoria, Australia
- 3:55 PM – 4:15 PM 12.8 Rehydrating Desiccated Hands in less than 24 Hours: A Comparison of Two Methods
Christian G. Torres, MS, Regional Medical Examiner Office, Newark, New Jersey, United States of America
- 4:15 PM – 4:45 PM 12.9 Casualties of War: An Early Investigation of a War Crime by the US Military
William C Rodriguez, III, PhD, Office of the Armed Forces Medical Examiner, Dover AFB, Delaware, United States of America
- 5:15 PM – 8:45 PM** **OPTIONAL WORKSHOP 2: FORENSIC PATHOLOGY-RELEVANT "PATIENT SAFETY" COURSE**
Moderator: Laura D. Knight, MD, Washoe County Regional Medical Examiner's Office, Reno, Nevada, United States of America
Gardenia, Second Level
- 5:15 PM – 8:45 PM W2 Forensic Pathology-Relevant "Patient Safety" Course
Laura D. Knight, MD, Washoe County Regional Medical Examiner's Office, Reno, Nevada, United States of America
- 8:45 PM Meeting Adjourns

POSTER PRESENTATIONS:

Please note posters P1-P5 and P7-P36 must be on the assigned board by Saturday, October 13 at 8:00 AM and remain posted until 5:00 PM. Posters P6 and P37-P78 must be on the assigned board by Sunday, October 14 at 8:00 AM and remain posted until 5:00 PM. Posters P79-P121 must be on the assigned board by Monday, October 15 at 8:00 AM and remain posted until 12:00 PM Tuesday, October 16.

It is required that presenters are to stand by their posters during the presentation time for discussion of their posters with meeting attendees that will occur:

P1 – P5; P7 – P36: Saturday, October 13, 12:30 PM – 1:30 PM

P6; P37 – P78: Sunday, October 14, 12:30 PM – 1:30 PM

P79 – P121: Monday, October 15, 12:30 PM – 1:30 PM

P1 A Peculiar Case of Suicide with an Air Rifle: Multiple Wounds, Minimal External Blood Loss, and an Ingested Tooth

**Adesuwa T. Egharevba, MD, University of North Carolina - Chapel Hill, Cary, North Carolina, United States of America*

P2 Opiates and the Possible Link to Suicide The Effects of Opiates/Opioids on the Brain

*****Alyssa L. Lytle, BS, Office of Chief Medical Examiner, Concord, New Hampshire, United States of America*

P3 Exploring the Potential of microRNAs and circRNAs in the Estimation of PMI

*****Chunyan Tu, Department of Forensic Medicine School of Basic Medical Sciences Fudan University, Shanghai, China*

P4 Postmortem Anthropophagy by Animals

**Stefanie Grewe, MD, University of South Florida, Tampa, Florida, United States of America*

P5 Hostage Situation Homicide

*****Samuel P. Prahlow, BS, Florida State University, Tallahassee, Florida, United States of America*

P6 In-Custody Death Due to Unrecognized Meningitis

**Benjamin E. Criss, DO, University of Cincinnati College of Medicine, Cincinnati, Ohio, United States of America*

P7 Ketamine Intoxication from a Topical Preparation Contributing to Heart Disease

**Ibrahim Abukhiran M Abukhiran, MBBS, University of Iowa Hospitals and Clinics, Iowa city, Iowa, United States of America*

P8 A Competitive Eater with Purging Induced Electrolyte Abnormalities and Prolonged QT Interval

**Michael Harrell, MD, New Mexico Office of the Medical Investigator, Albuquerque, New Mexico, United States of America*

P9 Phencyclidine-Associated Rhabdomyolysis and Disseminated Intravascular Coagulation

Chantel Njiwaji, MD, Washington DC Medical Examiner Office, Washington, District of Columbia, United States of America

P10 Chronic Ascending Aortic Dissection:Rationale For Manner Of Death Classification

Chantel Njiwaji, MD, Washington DC Medical Examiner Office, Washington, District of Columbia, United States of America

P11 Forensic Autopsy Aids in Adjudication of a Murder Case

*****Thomas Duong, BS, Western Michigan University School of Medicine, Kalamazoo, Michigan, United States of America*

P12 Cocaine Use and Pulmonary Embolism: Can Cause and Effect Be Established?

**Michael P.A. Williams, M.D M.Sc, SUNY Upstate Medical University, Syracuse, New York, United States of America*

P13 Acute Obstructive Hydrocephalus Secondary to Primary Intraventricular Meningioma: A Rare Cause of Sudden Unexpected Death

**Teddi L. Tubre, MD, Creighton University Medical Center, Omaha, Nebraska, United States of America*

P14 Sudden Death Due to Atraumatic Spontaneous Esophageal Rupture: A Case Report

*****Emily M. Shaffer, BS, West Virginia School of Osteopathic Medicine, Parsons, West Virginia, United States of America*

P15 Geospatial and Demographic Analysis of Suicide Modalities in an Urban Midwestern County

*****Alexis Griffith, MPH, Case Western Reserve University, Cleveland, Ohio, United States of America*

P16 Fulminant Herpes Simplex Virus Hepatitis Following Burn Injuries

**Megan R. Lawless, MD, University of Nebraska Medical Center, Omaha, Nebraska, United States of America*

P17 The Opioid Crisis: Out of Hand...and On Fire. A Case Report of an Unusual Opioid-Related Fatality

**Anne M. Laib, MD, University of Cincinnati Medical Center, Newport, Kentucky, United States of America*

P18 Drug Toxicity and Sudden Death in Infants and Toddlers

**Nicole E. Stanley, MD, University of Utah, Salt Lake City, Utah, United States of America*

P19 Pregnancy-Related Mortality at Montefiore Medical Center

Angela N. Baldwin, MD, MPH, Montefiore Medical Center, Bronx, New York, United States of America

P20 When Cultures Fail: Postmortem Decoy Receptor 3 (DcR3) as a Marker of Antemortem Sepsis

**Katrina M. Thompson, MD, University of Wisconsin Hospital and Clinics, Madison, Wisconsin, United States of America*

P21 Look What The Storm Blew In: Partial Mandible Recovered in Galveston, Texas

**Brooke H. Blake, MD, University of Texas Medical Branch, Galveston, Texas, United States of America*

P22 Drowning Deaths in the State of Rhode Island

**Natalia Belova, MD, Brown University, Providence, Rhode Island, United States of America*

P23 Cerebral Vascular Thrombosis Associated with Ulcerative Colitis

**Shannon M. Crook, MD, Southwestern Institute of Forensic Sciences, Dallas, Texas, United States of America*

P24 An Examination of Deaths at YMCAs from 2014-2017

**Claire Rosalie Sorensen, MD, Northwestern Memorial Hospital, Chicago, Illinois, United States of America*

P25 Death from Constipation: The Abdominal Compartment Syndrome

**Allison Cooper, MD, Baylor University Medical Center, Dallas, Texas, United States of America*

P26 Postmortem FilmArray Respiratory Pathogen Panel Testing in Pediatric Decedents

**Amanda L. Ho, MD, University of Utah, Salt Lake City, Utah, United States of America*

P27 A Case of Traditional Indian Medicine Causing Combined Mercury, Arsenic, and Lead Heavy Metal Toxicity

**David Michael Waters, MD, Northwestern University, Feinberg School of Medicine, Chicago, Illinois, United States of America*

P28 Fact or Fiction? Dispelling Suicide Myths

**Rachel Lynn Geller, MD, Emory, Atlanta, Georgia, United States of America*

P29 Compression Asphyxia Associated with Community Donation Bins: A Description of Multiple Fatal Cases in British Columbia

**Tyler B.M. Hickey, MD, PhD, University of British Columbia, Vancouver, British Columbia, Canada*

P30 Calling an Audible: Continuity of Medicolegal Operations During a Superbowl

***Shawn J. Wilson, BS, F-ABMDI, Hennepin County Medical Examiner, Minneapolis, Minnesota, United States of America*

P31 Death in Custody: a Nine-Year Review of Custodial Deaths in Allegheny County, PA

**Stacey L. Reed, DO, Allegheny General Hospital, Pittsburgh, Pennsylvania, United States of America*

P32 Compressed Air Tank Explosion at Marijuana Factory: A Case Study

**Adam Covach, MD, University of Michigan, Detroit, Michigan, United States of America*

P33 Cyclopropyl Fentanyl: A New Designer Opioid in Metro Detroit

**Eleftherios Terry Vouyoukas, MD, St John Hospital and Medical Center, Detroit, Michigan, United States of America*

P34 Outcome of Cases Referred as Possible Drug Overdose, Demographics and Comorbidity: A Study From Rural Eastern North Carolina

**Iana Lesnikova, MD, Ph.D, Vidant Medical Center, Greenville, North Carolina, United States of America*

P35 Crime Scene Analysis Using DNA Testing of Dog Feces--A Case Report

*****Vishal R Somnay, BS, Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, Michigan, United States of America*

P36 Multiple Suicidal Gunshot Wounds without Immediate Incapacitation – Autopsy Findings and Challenges

*****Allan Joseph Medwick, EdD, Lund University, Kalamazoo, Michigan, United States of America*

P37 Microscopic Pulmonary Tumor Emboli: Unusual Presentation of Occult Cervical Carcinoma. Two Case Reports and Review of the Literature

*****Daniel Kirsch, BA, Boston University School of Medicine, Boston, Massachusetts, United States of America*

P38 Ehlers-Danlos Syndrome IV: A Confusing Presentation and Question of Manner of Death

**Dilhani Amarasinghe, District 4 Medical Examiner's Office, Jacksonville, FL, Jacksonville, Florida, United States of America*

P39 Sudden Death With a Left Ventricular Assist Device (LVAD): Forensic Considerations

**Sarah C. Thomas, MD, University of South Florida, Tampa, Florida, United States of America*

P40 A Case Series of Myocardial Infiltrating Quilty Lesions in Cardiac Allografts Associated with Sudden Cardiac Death

**Megan R. Lawless, MD, University of Nebraska Medical Center, Omaha, Nebraska, United States of America*

P41 Right Ventricular Endomyocardial Fibrosis: A Neglected Cause of Sudden Cardiac Death in the Western World

**Aditi Vidholia, MBBS, DDVL, University of Iowa Hospitals and Clinics, Iowa City, Iowa, United States of America*

P42 The Curious Case of a Bloodless Aortic Rupture: Sudden Death Due to Aortic Rupture into the Lung

**Krista G. Chain, MD, University of Michigan- Michigan Medicine, Ann Arbor, Michigan, United States of America*

P43 The Significance of Axonal Spheroids in Diffuse Axonal Injury at the Time of Autopsy

**Anna Lane Tart, MD, University of Arkansas for Medical Sciences, Little Rock, Arkansas, United States of America*

P44 Death Due to Nonbacterial Thrombotic Endocarditis in the Setting of Antiphospholipid Antibody Syndrome and Factor V Leiden Deficiency: A Case Report

**Leah Marie Schuppener, DO, University of Wisconsin-Madison Hospital and Clinics, Madison, Wisconsin, United States of America*

P45 Dysembryoplastic Neuroepithelial Tumor: An Unexpected Cause of Seizures and Death

**Jessica Gulliver, MD, University of Wisconsin Hospital and Clinics, Madison, Wisconsin, United States of America*

P46 Hydroxychloroquine-Induced Cardiomyopathy

**Jagbir Khangura, MD, Southwestern Institute of Forensic Sciences, Dallas, Texas, United States of America*

P47 A Rare Case of Takayasu Arteritis Diagnosed at Autopsy and Review of the Literature

**Cori Ann Breslauer, MD, University of North Carolina Hospitals, Chapel Hill, North Carolina, United States of America*

P48 A Case of Previously Unsuspected Cardiac Sarcoidosis Diagnosed at Autopsy and 23-Year Review of One Institution's Sarcoidosis Deaths

**Catherine R. Miller, MD, The University of Texas Medical Branch at Galveston, Galveston, Texas, United States of America*

P49 Creutzfeldt-Jakob Disease Mimicking Neurosyphilis: A Complex Presentation, Histopathological Findings, and Special Precautions for Autopsy

**Rhonda M. Mittenzwei, BS, MD, Duke University Medical Center, Durham, North Carolina, United States of America*

P50 Determination of Cardiomegaly in Cases of Sudden Death in the Young

****Zachary J. Schoppen, BA, Northwestern University, Chicago, Illinois, United States of America*

P51 Overdose or Infective Endocarditis?: Chest Pain in the Setting of Acute Substance Use

****Linda Song, MD, Bergen County Medical Examiner Office, Paramus, New Jersey, United States of America*

P52 Hypertrophic Cardiomyopathy in an 11-month Female Child: A Rare Etiology of a Sudden Cardiac Death

Giancarlo Di Vella, MD, PhD, University of Turin, Turin, Italy

P53 Glycogen Storage Disease Type IV Diagnosed at Autopsy in a Preterm, Still Birth Delivery to Mother with Recurrent Pregnancy Losses

**Daniel C. Butler, MD, Medical University of South Carolina, Charleston, South Carolina, United States of America*

P54 Sudden Unexpected Death Associated with Volvulus

**Reema Khan, Loyola University Medical Center, Maywood, Illinois, United States of America*

P55 Pop Goes Pathology: How Pathologists are Portrayed in Popular Culture & Implications for Recruitment

**Leslie M. Anderson, MD, M.Ed., University of Manitoba, Winnipeg, Manitoba, Canada*

P56 The Tissue Recovery Personnel Guide to Medical Examiner and Coroner Cases

***Jonathan Boyd, CTBS, American Association of Tissue Banks, McLean, Virginia, United States of America*

P57 Disinfectant and Antiseptic Poisonings: A Report of Twelve Fatal Cases and Review of the Literature

**Lauren Havrilla, DO, Duke University Medical Center, Durham, North Carolina, United States of America*

P58 Post-Traumatic Hypopituitarism: A Retrospective Analysis of Forensic Cases

Debra Berry, MD, MS, University of Virginia Health System, Charlottesville, Virginia, United States of America

P59 Injury as an Impetus for Deep Vein Thrombosis in a Patient with History of Immobilization and Pulmonary Embolism

Elizabeth McKinnon, MD, Duke University Medical Center, Durham, North Carolina, United States of America

P60 Brainstem Hemorrhage with Unexpected Histology

Elicia Goodale, BA, Charles E. Schmidt College of Medicine at Florida Atlantic University, Delray Beach, Florida, United States of America

P61 Spontaneous Extracranial Vertebral Artery Dissection in a Neurofibromatosis 1 Patient with Bilateral Intrathoracic Spinal Meningoceles around the Scoliosis: Report of an Autopsy Case

Ji Hye Park, MD, National Forensic Service, Jangseong-gun, Jeollanam-do, Korea (Republic of)

P62 Neuropathological Correlates in a Post-Mortem Adult Patient with History of Childhood Mumps Encephalitis

Cassie Briana MacRae, MD, Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, Massachusetts, United States of America

P63 A Case of Idiopathic Hepatic Artery Pseudoaneurysm Diagnosed at Autopsy

Emma Henrie, MD, University of Texas-Medical Branch, Galveston, Texas, United States of America

P64 Soccer, A Silent killer in Central American Teenagers?

Sasha Breland, MD, District of Columbia Office of the Chief Medical Examiner, Washington, District of Columbia, United States of America

P65 An Autopsy Case of a Charred Body with an Antemortem Diagnosis of Juvenile Alzheimer's Disease

Naohito Kuroda, MD, PhD, Fukushima Medical University, Fukushima, Japan

P66 Right Ventricular Rupture Following Open Heart Surgery

Deland J. Weyrauch, MD, University of North Dakota School of Medicine and Health Sciences, Grand Forks, North Dakota, United States of America

P67 Sudden Unexpected Death in a Child From an Anaplastic Ependymoma.

William Thomas Harrison, MD, Duke University Medical Center, Durham, North Carolina, United States of America

P68 Disease Specific Nature of Microglial Neuroinflammation in TBI and CTE

Missia Kohler, MD, Cook County Medical Examiner's Office, Chicago, Illinois, United States of America

P69 Thoracic and Lumbar Nerve Root Hemorrhage in Pediatric Non-Accidental Head Trauma

Missia Kohler, MD, Cook County Medical Examiner's Office, Chicago, Illinois, United States of America

P70 Death Scene Investigations of Sleep Related Child Deaths, aged 1-4 years, Across Office Systems

Laura Gould Crandall, MA, NYU School of Medicine, New York, New York, United States of America

P71 Death Investigation and Organ Donation Can Coexist

Gina R Martin, BS, MS, Gift of Hope Organ and Tissue Donor Network, Peoria, Illinois, United States of America

P72 Thou Shalt Tweet (With Permission): Navigating Legal Guidelines on Social Media Contact

Ken Obenson, MBBS, Saint John Regional Hospital - Horizon Health Network, Saint John, New Brunswick, Canada

P73 Urological Surgery and Forensic Investigation: Unusual Case Report

Giancarlo Di Vella, MD, PhD, University of Turin, Torino, Turin, Italy

P74 Caught on Candid Camera: Technology and Medicolegal Death Investigations

Lauren B. Silver, BA, Commonwealth of Virginia Office of the Chief Medical Examiner- Northern District, Manassas, Virginia, United States of America

P75 Evaluating Efficacy of the 2016 Right to Die Law in California through "Final Exit"-type Suicide by Inert Gas and Exit Bag Cases: An Unexpected Finding
Joseph Vallone, MD, Los Angeles County Department of Medical Examiner-Coroner, Los Angeles, California, United States of America

P76 A Retrospective Study of Traffic Fatalities in Taiwan (2007-2016)
Ju-Hui Chung, Institute of Forensic Medicine, Ministry of Justice, Taiwan, New Taipei City, Taiwan (R.O.C.), Taiwan

P77 Study on the Degradation of β -actin mRNA and 18S rRNA in Spleen Cells of Mice after Death
Dong Zhao, MD PhD, Key Laboratory of Evidence Science (China University of Political Science and Law), Beijing, China

P78 Death Due to Atypical Urinothorax Following Percutaneous Nephrolithotomy: A Case Report
Ray-Young Tsao, BS, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America

P79 Causes of Sudden Unexpected Death in Schizophrenia Patients: A Forensic Autopsy Population Study
Ling Li, M.D., Office of the Chief Medical Examiner, State of Maryland, Baltimore, Maryland, United States of America

P80 A Fatal Case of Pulmonary Lymphangitic Carcinomatosis of Colonic Origin Masquerading as Interstitial Lung Disease
Marianne E. Beynon, MD, Baylor College of Medicine, Houston, Texas, United States of America

P81 Multi-Analytical Screening of Drugs of Abuse and Creatinine from a Single Urine Sample in Less than Twenty Minutes with the Fully Automated Biochip Analyser Evidence MultiSTAT [NOT ELIGIBLE FOR CME]
A. Johnston, Radox Toxicology Ltd, Crumlin, Northern Ireland, United Kingdom of Great Britain and Northern Ireland

P82 Green-Blue Organs at Autopsy
Katherine Cochrane, MD, University of Tennessee Medical Center at Knoxville, Knoxville, Tennessee, United States of America

P83 .40 Caliber Bullet Embolization: A Case Report
Kimberly M Golden, MD, D.C. Office of the Chief Medical Examiner, Washington, District of Columbia, United States of America

P84 When Water Kills: A Fatal Case of Psychogenic Polydipsia
Krista L. Timm, MD, Denver Office of the Medical Examiner, Denver, Colorado, United States of America

P85 Clinicopathologic Features of Acute Esophageal Necrosis, A Case Series
Justin Rueckert, DO, University of Vermont Medical Center, Burlington, Vermont, United States of America

P86 Accidental Opioid Drug Overdose Death Trends in Oklahoma, 2002-2016
Jeremy Shelton, MD, Oklahoma Office of the Chief Medical Examiner, Tulsa, Oklahoma, United States of America

P87 Preliminary Investigative and Pathological Findings in The North American SUDEP Registry (NASR)
Chloe Verducci, BA, NYU Comprehensive Epilepsy Center, New York, New York, United States of America

P88 Gabapentin in Association with Opioid Deaths
Lee Marie Tormos, MD, Palm Beach County Medical Examiner Office, West Palm Beach, Florida, United States of America

P89 Occult Cardiac Amyloidosis: The Last Chapter of a 5-Year Long Story
Giancarlo Di Vella, MD, PhD, University of Turin, Torino, Turin, Italy

P90 Reconstruction of Vehicle-human Crash Accident and Injury Analysis Based on 3D Laser Scanning, 3D Motion Capture and Multi-rigid-body Reconstruction
Donghua Zou, Shanghai Key Laboratory of Forensic Medicine, Academy of Forensic Science, Shanghai, China

P91 Gunshot Wounds: Misinterpreting the Mimickers
Mary Tekla Ann Weldon, MS, D-ABMDI, Office of the Chief Medical Examiner - Northern District, Manassas, Virginia, United States of America

P92 A Potpourri of Pills: A Case Report of a Fatal Oxcarbazepine Overdose

Edward A. Reedy, PhD, MD, Alabama Department of Forensic Sciences, Montgomery, Alabama, United States of America

P93 Death by Electric Power Drill: A Case Report and Review of Current Literature

Ross James Miller, MD, Oklahoma Office of the Chief Medical Examiner, Tulsa, Oklahoma, United States of America

P94 Study of the Test for Postmortem C-Reactive Protein in Routine Autopsy Practice

Yeon Ho Oh, Forensic Medicine Division, National Forensic Service Gwangju Institute, Gwangju, Korea (Republic of)

P95 Distance and Everything in Between: Importance of Correlation of Thorough Scene Investigation and Autopsy Findings in Determining Range of Fire

Phinon Beckham, BS, MFS, Office of the Chief Medical Examiner, Commonwealth of Virginia, Northern District, Manassas, Virginia, United States of America

P96 Pulmonary Fat Embolism during Cemented Arthroplasty

Yulai Wang, MD, Los Angeles County, Department of Medical Examiner-Coroner, Los Angeles, California, United States of America

P97 Unintentional Partial Preservation of Remains, Did You Say Lye or Lime?

Carl Christopher Stacy, MD, University of Missouri, School of Medicine, Columbia, Missouri, United States of America

P98 Do Toxic Adulterants in Street Drugs Contribute to the Cause of Death in Drug Users?

M. Frederic Rieders, PhD, NMS Labs, Willow Grove, Pennsylvania, United States of America

P99 Etizolam Assessment in a Helium Death

Charles A. Catanese, MD, Westchester County Medical Center, Valhalla, New York, United States of America

P100 Bone-Encased Bullet in a Nonfatal Gunshot Wound to the Head Mimicking Homicide in a Decomposed Male

Darin L. Wolfe, MD, Indiana Forensic & Surgical Pathology, LLC, Indianapolis, Indiana, United States of America

P101 Asphyxia due to Plastic Bag Over Head and Nitrous Oxide: An Accident or a Suicide?

Mary Tekla Ann Weldon, MS, D-ABMDI, Office of the Chief Medical Examiner - Northern District, Manassas, Virginia, United States of America

P102 An Unusual Suicide by Ingestion of Eosin

Luisa Andrello, MD, PhD, Medico Legal Service of Canton Ticino, Bellinzona, Switzerland - canto ticino, Switzerland

P103 Pilot Study of Postmortem Thyroid Function Tests

Sohyung Park, MD, PhD, National Forensic Service, Seoul, Korea (Republic of)

P104 Dating Splenic Rupture in Alleged Malpractice

Giancarlo Di Vella, MD, PhD, University of Turni, Torino, Turin, Italy

P105 Death after Bronchoscopic Biopsy of a Pulmonary Artery Aneurysm Mimicking Bronchial Polyp: Report of 2 Cases and Review of the Literature

Ji Hye Park, National Forensic Service, Jangseong-gun, Jeollanam-do, Korea (Republic of)

P106 Point-of-Care Testing for C-Reactive Protein during Postmortem Examinations

Yeon Ho Oh, Forensic Medicine Division, National Forensic Service Gwangju Institute, Gwangju, Korea (Republic of)

P107 Scuba Fatalities Revisited

F. John Krolkowski, MD, Delaware State Medical Examiners Office, Wilmington, Delaware, United States of America

P108 Paraffin Embedded Tissue Samples: A Good Reference Sample for DNA Comparison

Gary L. Collins, MD, Delaware Division of Forensic Science, Wilmington, Delaware, United States of America

P109 Benign Uterine Leiomyoma Resulting in Anemia and Fatal Hemorrhage: A Case Report

Melinda Flores, MD, University of Texas Southwestern Medical Center, Dallas, Texas, United States of America

P110 Buprenorphine: Decedents versus Impaired Drivers

Sara E. Ohanessian, MD, Virginia Office of the Chief Medical Examiner, Roanoke, Virginia, United States of America

P111 Evidence of Growing Misuse and Abuse of Loperamide

M. Frederic Rieders, PhD, NMS Labs, Willow Grove, Pennsylvania, United States of America

P112 Gunshot Wound to Anterior Neck, a Case Report

Emma Henrie, MD, University of Texas-Medical Branch, Galveston, Texas, United States of America

P113 Utilizing Federal, State, and Local Drug Reporting Databases to Analyze Epidemiological Toxicology Data and Assess Trends Over Time

Heidi Lynn Reinhard, MD,MS, Penn State Milton S. Hershey Medical Center, Hershey, Pennsylvania, United States of America

P114 Abnormal Undress in a Case About Drowning After Pathological Subarachnoid Hemorrhage

Zhonghua Li, 1.Sichuan University; 2.Sichuan Provincial People's Procuratorate, Chengdu, Sichuan, China

P115 Sudden Exertional Death in Two Young Adults with Sickle Cell Trait

Katherine Cochrane, MD, University of Tennessee at Knoxville Medical Center, Knoxville, Tennessee, United States of America

P116 Fatal Dog Attacks and Seizure Disorders: A Limited Case Series

Amanda Spencer, DO, Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, United States of America

P117 Alcohol and Crime: A Study of The Blood Alcohol Concentration Found in 280 Cases Collected From Persons Arrested for Various Offences During or Immediately after the Commission of Offence.

Millo Tabin, MD, All India Institute of Medical Sciences, New Delhi, India, New Delhi, Delhi, India

P118 Homicidal Neck Compression- Should Histological Sampling of Neck Muscles Be Routine?

Peter M. Mazari, MD, PhD, New Jersey - Southern Regional Medical Examiner's Office, Woodbine, New Jersey, United States of America

P119 Use of Postmortem Computed Tomography (PMCT) in Second Autopsy and Embalmed Cases

Howard T. Harcke, MD, Armed Forces Medical Examiner System, Dover Air Force Base, Delaware, United States of America

P120 A Medical Examiner's Investigation of a Work-Related Fatality

Matrina Janelle Schmidt, MD, William L. Jenkins Forensic Center, East Tennessee State University, Johnson City, Tennessee, United States of America

P121 Peritoneal Carcinomatosis Secondary to Adenocarcinoma Arising in a Colonic Diverticulum

Lindsey J Haldiman, DO, Jackson County Medical Examiner's Office, Kansas City, Missouri, United States of America

Exhibit Schedule

Exhibit Installation

Friday, October 12 1:00PM – 5:00PM

**Companies requiring additional installation time should contact NAME Exhibits Management for assistance. Early move-in may be subject to additional fees.*

Exhibitor Registration

Friday, October 12 10:00AM – 5:00PM

Saturday, October 13 8:00AM – 4:00PM

Sunday, October 14 8:00AM – 1:00PM

Overall Exhibit Hall Hours

Friday, October 12 5:30PM – 9:00PM

(Exhibits Open During Opening Reception and Welcome Dinner)

Saturday, October 13 8:00AM – 4:00PM

Exhibit Hall Open: OPTIONAL

6:45AM – 8:00AM

Breakfast will be served in the Exhibit Hall

Sunday, October 14 8:00AM – 1:00PM

Exhibit Hall Open: OPTIONAL

6:45AM – 8:00AM

Breakfast will be served in the Exhibit Hall

Published Visiting Hours

Friday, October 12 5:30PM – 9:00PM

Saturday, October 13 10:00AM – 10:30AM

3:30PM – 4:00PM

Sunday, October 14 10:00AM – 10:30AM

Exhibit Dismantling

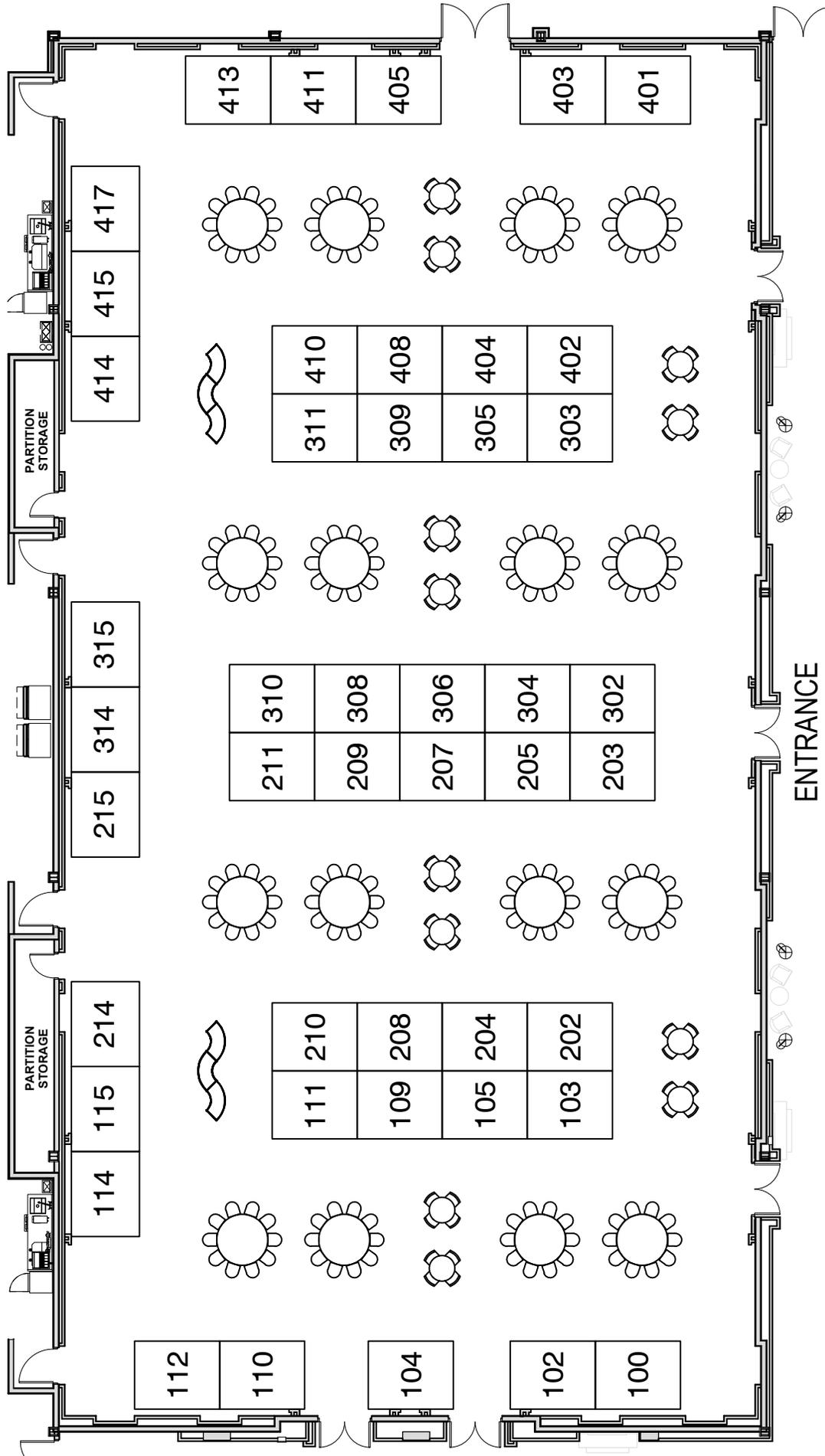
Sunday, October 14 1:00PM – 5:00PM

**No packing or dismantling of exhibits will be permitted until 1:00PM, Sunday, October 14. Early departure will result in the company or group being penalized a fee no less than \$500 and may result in being prohibited from participating in future NAME events.*

NAME 2018 Annual Meeting

October 12-14, 2018

Hilton/Oceana Ballroom/West Palm Beach, FL



EXHIBITOR DESCRIPTIONS

20/20 IMAGING, A DIVISION OF KONICA MINOLTA HEALTHCARE (BOOTH # 115)

20/20 Imaging, a division of Konica Minolta, is the leading provider for state of the art, digital imaging solutions. Our lightweight, wireless DR panels will provide you with unsurpassed image quality at an affordable cost. See how we can provide you with the best solution for your needs.

For more information visit: www.2020imaging.net

ADVANCED DETECTION SOLUTIONS (BOOTH # 209)

Introducing ForensicSCAN™ whole-body forensic x-ray system. Simultaneous Dual View: captures & displays both AP and Lateral views in one scan/in less than 45 seconds. Bariatric Image friendly: 43"W; 6'11"H; Weight 550 lbs. Wide/Long Scanned Area: 35"W x82.7"L. Few moving parts: less downtime/less maintenance cost. High contrast resolution: 16 bits. Easy operation. Low cost of ownership.

For more information visit: www.detection-solutions.com

ADx HEALTHCARE (BOOTH # 215)

ADx Healthcare, a physician-owned entity, provides private-pay testing and brain autopsy services for Alzheimer's disease and related dementias. Our brain autopsy service offers answers to families living with the burden of Alzheimer's disease, and our genetic and biomarker testing offers a proactive step toward disease prevention and risk mitigation for individuals worried about their Alzheimer's risk.

For more information visit: www.adxhealthcare.com

AMERICAN BOARD OF MEDICOLEGAL DEATH INVESTIGATORS (BOOTH # 102)

The American Board of Medicolegal Death Investigators (ABMDI) is a voluntary national, not-for-profit, independent professional certification board that has been established to promote the highest standards of practice for medicolegal death investigators. ABMDI certifies individuals who have the proven knowledge and skills necessary to perform medicolegal death investigations as set forth in the National Institutes of Justice 1999 publication Death Investigation: A Guide for the Scene Investigator (2011).

For more information visit: www.abmdi.org

ASSOCIATION OF ORGAN PROCUREMENT ORGANIZATIONS (BOOTH # 203)

The Association of Organ Procurement Organizations (AOPO) is a non-profit, national organization representing all federally-designated organ procurement organizations (OPOs). The association represents and serves OPOs through advocacy, support and the development of activities that will maximize the availability of organs and tissues and enhance the quality, effectiveness and integrity of the donation process. OPOs are federally-designated non-profit organizations that are responsible for coordinating organ and tissue donation across the United States, bridging the gap between the generous donation of organs and tissues and the thousands in need of these gifts.

For more information visit: www.aopo.org

AUTISM BRAIN NET (BOOTH # 311)

Autism BrainNet is a collaborative network of University-based repositories for the acquisition and distribution of postmortem brain tissue to facilitate autism research. By providing this precious resource for research, Autism BrainNet aims to improve the understanding, diagnosis and treatment of autism and related neurodevelopmental disorders. Our mission, in partnership with the medical examiner community, is to communicate the need for donated brain and other tissue and develop a sensitive, transparent and effective strategy for acquiring and distributing the highest quality tissue for research worldwide.

For more information visit: www.autismbrainnet.org/

AXIS FORENSIC TOXICOLOGY, INC (BOOTH # 308)

Axis is a nationally accredited laboratory that specializes in illicit and prescription drug forensic toxicology testing and litigation services associated with postmortem and law-enforcement cases. Our mission is to contribute to an effective justice system that brings closure to people and communities by providing accurate, timely, and relevant toxicology results from our industry leading testing protocols, cost effective products, and access to subject matter experts.

For more information visit: www.axisfortox.com

CANON MEDICAL SYSTEMS USA (BOOTH # 211)

Starting with the industry's biggest and widest bore coupled with the highest capacity couch add thinnest slices, largest field of view (FOV) Canon Large Bore offers the perfect combination of image quality bariatric imaging and CT interpretation. Canon LB covers more anatomy with greater coverage and accuracy, 90cm. Bore opening, 85 cm field of view.

For more information visit: www.us.medical.canon

CRC PRESS, TAYLOR AND FRANCIS GROUP (BOOTH # 309)

Taylor and Francis Group/CRC Press is a leading publisher of technical references and textbooks in forensic science, forensic pathology, physical evidence, and crime scene investigation. Review new and bestselling books and receive 20-50% off on conference specials. Talk to us about being a CRC Press Author!

For more information visit: www.crcpress.com

CSI/JEWETT (BOOTH # 404)

For more than 150 years, CSI/Jewett has developed equipment an extensive line of Morgue, Autopsy and Laboratory Equipment. CSI/Jewett provides an integrated system of equipment to enhance work flow, improve space utilization and maximize the efficiency and ease of cadaver handling. From fast and efficient high-volume processing, to customized traditional installations, CSI/Jewett has the best equipment and technical support to meet your needs.

For more information visit: www.csi-jewett.com

FARO TECHNOLOGIES INC. (BOOTH # 210)

FARO® is the world's most trusted source for 3D measurement, imaging and realization technology. FARO specializes in 3D scanning and software for public safety and forensic professionals. Accurately document everything needed to analyze the event and create compelling courtroom presentations.

For more information visit: www.faro.com

FIRST SOURCE, INC. (BOOTH # 403)

First Source provides X-ray imaging solutions in a multitude of formats: on-site, field and mobile. The portable Vision M system has the ability to easily transition from the office and be transported to location for accurate, high resolution X-ray imaging. First Source takes pride in customizing solutions to meet the needs of its Customers – Contact us today to discuss how we can support your imaging needs! 800.349.5980 | 585.272.1690 | sales@fsimed.com

For more information visit: www.visarisamericas.com

FORENSIC ADVANTAGE SYSTEMS (BOOTH # 208)

Forensic Advantage® Systems provides solutions for medical examiners and coroners. Forensic Advantage case management, Incident Response 360 and cloud-based options.

For more information visit: www.forensicadvantage.com

INFECTIOUS DISEASE PATHOLOGY BRANCH, CENTERS FOR DISEASE CONTROL AND PREVENTION (BOOTH # 103)

CDC's Infectious Diseases Pathology Branch (IDPB) conducts laboratory studies and investigations of infectious diseases of unknown cause, including unexplained, potentially infectious deaths identified by medical examiner/coroners. IDPB performs diagnostic testing for a wide range of pathogens on formalin-fixed, paraffin-embedded tissues and contributes to CDC's public health mission through the diagnosis, surveillance and furthering knowledge about the cause of infectious diseases.

For more information visit: www.cdc.gov/ncezid/dhcpp/idpb/index.html

INVITAE (BOOTH # 105)

Invitae's mission is to bring comprehensive genetic information into mainstream medical practice to improve the quality of healthcare for billions of people. Our goal is to aggregate most of the world's genetic tests into a single service with higher quality, faster turnaround time and lower prices.

For more information visit: www.invitae.com

KUBTEC (BOOTH # 314)

At Kubtec®, our passion is designing innovative digital X-ray systems that meet customer needs for scientific, forensic, and industrial applications. Our versatile and expanded product lines include: cabinet X-ray systems, Flat Panel Detectors, and portable X-ray systems. Our comprehensive software packages include 3-D Tomosynthesis imaging.

For more information visit: www.kutbec.com

LIFESIGN (BOOTH # 302)

LifeSign is a medical diagnostics company delivering rapid point of care testing products to caregivers in critical care, physicians' offices, criminal justice and more. Lifesign's line of products is used worldwide for the detection of Infectious Disease, Women's Health, Drugs of Abuse and Cardiac Markers. Our products are developed and manufactured in the USA under ISO, FDA, CGMP and CE Guidelines.

For more information visit: www.lifesignmed.com

LODOX SYSTEMS (BOOTH #s 303/305)

Introducing **eXero-dr- rapidly evident.**

The first and only, full-body, high-speed digital radiology solution premeditated for forensic pathology. Lodox provides a time-saving, low-dose investigation of the entire body in less than 5 minutes. An imaging solution used around the world in multiple applications such as major Trauma, Mass Casualty, Pediatric, Bariatric, Bone Scans, and Forensic Medico-Legal Investigations.

For more information visit www.exero.lodox.com

MOPEC (BOOTH # 414)

Mopec provides American-made equipment and laboratory products to the pathology, mortuary, autopsy, necropsy and histology industries. Founded in 1992, Mopec solutions are among the very best as demonstrated by the vast number of installations in America's top healthcare institutions and facilities. Our reputation, which continues to grow worldwide, is built on decades of superior customer service specializing in consultation and customization.

For more information visit: www.mopec.com

MORTECH MANUFACTURING (BOOTH # 104)

Mortech Manufacturing is family owned and operated since 1985 as a leader in high quality stainless steel Autopsy and Lab Equipment plus Cold Room Projects. From the beginning, it has been our commitment to provide and manufacture quality equipment for a long lasting customer partnerships. Mortech is an ISO Certified Company with established UL/CE standards to proudly manufacturer products 'MADE IN THE USA'

For more information visit: www.mortechmfg.com

MORTUARY LIFT COMPANY, INC. (BOOTH # 114)

The Mortuary Lift Company has been providing top quality, dependable body lifts to medical examiners for over sixty years. It's custom engineered to handle all of your lifting needs up to 1,000 lbs.

Increases productivity, conserves valuable floor space and we offer turn key solutions.

No more worries about safety and lifting alone when you have the Ultimate 1000 Lift.

For more information visit: www.mortuarylift.com

MORTUARY RESPONSE SOLUTIONS (MRS) (BOOTH # 413)

Mortuary Response Solutions (MRS) is the leading manufacturer of mass fatality response equipment which includes the patented Mortuary Enhanced Remains Cooling System, MERCSys, complete portable morgue facilities, identification and processing equipment, custom morgue trailers and complete mass fatality response solutions.

For more information visit: www.wwdrg.com

NATIONAL MISSING AND UNIDENTIFIED PERSONS SYSTEM (BOOTH # 109)

Funded and administered by the National Institute of Justice, the national Missing and Unidentified Persons System (NamUs) offers free resources to resolve long-term missing and unidentified persons across the country. Our newly-upgraded NamUs database technology includes enhanced searching, case mapping and case management tools.

For more information visit: www.namus.gov

NMS LABS (BOOTH # 402)

NMS Labs, as a leader in forensic science, partners with law enforcement when they are faced with a backlog of tests or are in need of a full time outsource partner that offers speed, quality and integrity. With over 2,500 tests, NMS Labs offers unsurpassed service and value as the preferred provider of testing services in forensic laboratory science.

For more information visit: www.nmslabs.com

QUALTRAX (BOOTH # 304)

Qualtrax is a compliance software solution that manages documents, processes, training and accreditations. Paired with an enthusiastic and technically astute team, Qualtrax is a comprehensive solution that supports companies and organizations who make critical contributions to society. Qualtrax transforms compliance realities by creating efficiencies, traceability, reduced risk, and visibility across organizations.

For more information visit: www.qualtrax.com

QUANTUMMARK, LLC (BOOTH # 111)

Are issues like COD reporting, timeliness and technology utilization causing you headaches and business problems? We've got the solution – and it revolves around meeting YOUR specific needs. QuantumMark provides peace of mind through training, project management and best practices from 20 years of working with organizations like yours, ensuring your team has effective tools in hand for sustainable success.

For more information visit: www.quantummark.com

QUINCY TECHNOLOGIES (BOOTH # 408)

QuincyTech provides state-of-the-art automated office workflow and case management software for Medical Examiners and Coroner offices. Decades of successful forensic software development and implementation means that our team has the experience and resources you require.

For more information visit: www.quincytech.com

RANDEX TOXICOLOGY (BOOTH # 202)

Randex Toxicology deliver innovative solutions for fast and accurate drug detection. As the inventor of Biochip Array Technology for clinical and forensic toxicology, detecting over 500 drugs, we have the world's largest toxicology test menu. Our patented Biochip Array Technology, designed to work across multiple matrices, boasts cutting-edge multiplex testing capabilities facilitating simultaneous drug detection from a single sample.

For more information visit: www.randoxtoxicology.com

REGIONAL PATHOLOGY AND AUTOPSY SERVICES INC. (BOOTH # 401)

RPAS is a physician-owned professional medical corporation providing forensic and private autopsy services. Our reputation for reliability, professionalism, and compassion has become well known nationwide. We work with a variety of private clients to include law firms, hospitals, families, and research organizations. In addition to providing private autopsies, we also serve county coroner/ME offices as forensic pathologists and anthropologists.

For more information visit: www.regional-pathology.com

RTI INTERNATIONAL (BOOTH # 306)

An independent, nonprofit institute that provides research, development & technical services to government and commercial clients worldwide. Our mission is to improve the human condition by turning knowledge into practice.

For more information visit: www.rti.org

THE SUDC FOUNDATION (BOOTH # 207)

The SUDC Foundation is the only organization worldwide whose purpose is to promote awareness, advocate for research, and support those investigating, or affected by, sudden unexpected or unexplained deaths in childhood. Sudden Unexplained Death in Childhood (SUDC) is the fifth leading category of death in children ages one to four, yet SUDC receives no public funding. The SUDC Foundation provides all services at no cost to families and professionals it serves.

For more information visit: www.sudc.org

SUDEP INSTITUTE AND THE NORTH AMERICAN SUDEP REGISTRY (BOOTH # 205)

NASR is dedicated to uncovering the risk factors, causes, and mechanisms of SUDEP so that we may improve future epilepsy treatment and SUDEP prevention.

For more information visit: www.sudepregistry.org

TISSUE TECHNIQUES PATH LABS, LLC (BOOTH # 315)

Specializing in histology H&E, special stains, HIS for both standard slides (1x3) and large format (2x3).

For more information visit: www.tissuetechpathology.com

U.S. CONSUMER PRODUCT SAFETY COMMISSION (BOOTH # 214)

The U.S. Consumer Product Safety Commission protects the public from unreasonable risks of injury or death associated with the use of thousands of types of consumer products within the agency's jurisdiction. CPSC conducts epidemiological studies to estimate consumer product-related deaths and analyzes factors contributing to deaths through in-depth investigation of incidents. Results are used by CPSC to set priorities, support ban or recall of hazardous products, support development or evaluation of product standards and to educate the public. Medical examiners throughout the U.S. have a critical role to play in keeping the public safe and in contributing to CPSC's success.

For more information visit: www.tissuetechpathology.com

UNIVERSITY OF MARYLAND BRAIN & TISSUE BANK (BOOTH # 204)

The University of Maryland Brain and Tissue Bank was established to serve as a tissue resource center with the goals of collecting, storing and distributing human tissue for medical research, with a special focus on autism. The Bank works with medical examiners, individuals, support groups and researchers to offer hope and life to future generations.

For more information visit: www.medschool.umaryland.edu/btbank

VERTIQ SOFTWARE, LLC (BOOTH # 310)

CME has been redeveloped many times in order to offer our clients the benefit of the latest state of the art technology. We constantly strive to improve our software, based on the needs and feedback of our customers. Through this method we have been able to broaden the scope of our software. With a customer base spanning North America, and over 35 years of experience, this has further enabled us to remain domain experts in this field. VertiQ's newest application, CME-V3, our 100% Mobile Internet version is by far our premier application. CME-V3 offers a flexible system of integrated modules that can be utilized by both large and small agencies. Much of its configuration can be performed directly within the application by a user with System Administrator permissions. It is installable on either an in-house or cloud server.

For more information visit: www.vertiq.com

VMI SECURITY (BOOTH # 100)

Since 1985, the VMI Group has been dedicated to developing and manufacturing high-quality X-ray equipment. VMI has become one of the world's leading manufacturers in security cabinet and medical X-ray technology. VMI exports products to countries in South America, Europe, Africa, Asia and currently emerging in North America.

For more information visit: www.vmisecurity.com

MILTON HELPERN LAUREATE AWARD



THE NATIONAL ASSOCIATION OF MEDICAL EXAMINERS

The National Association of Medical Examiners began, as many great organizations do, from the dreams, ideas and wisdom of a few farsighted, socially conscious individuals. Back in 1965, Milton Helpern recognized the need for the nation's Medical Examiners to share their knowledge, expertise and experience in order to improve the medicolegal investigation of death in this country.

He discussed this concept with Richard Childs, the Executive Director of the National Municipal League, and a group of his close colleagues, Ali Hameli, Chief Medical Examiner, State of Delaware, Leslie Lukash, Chief Medical Examiner, Nassau County, New York, and Joseph Spellman, Chief Medical Examiner, City of Philadelphia. In the spring of 1966, these individuals formed a planning committee in order to bring Doctor Helpern's concept to reality. This group became the foundation and heart of what was later to become the National Association of Medical Examiners.

Through the dedication and efforts of these five men, N.A.M.E. was incorporated in August 1966. Subsequently they invited Chief Medical Examiners throughout the country to meet in Doctor Helpern's Office. As a result of that meeting, an interim steering board was formed which later paved the way for the first annual membership meeting held at the Knickerbocker Hotel in Chicago in February 1968.

JEFFREY M. JENTZEN, M.D.



The Executive Committee and Board of Directors of the National Association of Medical Examiners is extremely pleased to present the Milton Helpern Laureate Award to Jeffrey M. Jentzen, M.D. who has made outstanding contributions to the development and improvement of medicolegal investigations in the United States; who is highly respected by his colleagues for the highest excellence in forensic pathology, education, research, consultation and administration; and who has attained and is a living example of the principles, standards, and goals of the National Association of Medical Examiners.



Dr. Jentzen grew up in Ypsilanti, Michigan Southeast Michigan, home of the Willow Run Bomber Plant, "The Arsenal of Democracy." I was active in sports at Ypsilanti High School and a late-bloomer academically. I attended Michigan Technological University on a football and wrestling scholarship majoring in pre-med. In Houghton I met and married Dorianne Otto, the daughter of a pathologist! We have two children, Nicole and Kaitlin and four grandchildren.

I have been active in NAME for over thirty years in a number of positions including president in 2007. Dorianne was also very active over the years in supporting Mary Fran Ernst and Denise McNally during the annual NAME meetings.

Unsuccessful at my first attempt to medical school, I attended the Autonomous University in Guadalajara Mexico for two years before transferring to Wayne State University in Detroit. This international exposure would stimulate my international interests in the coming years. After medical school, I completed a flexible internship in Ann Arbor before traveling to Minneapolis for a pathology residency at Hennepin County Medical Center.

I entered the anatomic and clinical pathology residency at Hennepin County Medical Center in Minneapolis with the intention of being a general pathologist in the mold of my father-in-law. Dr. John Coe was the chairman of pathology at Hennepin County Medical Center and medical examiner for Hennepin County. I was reluctant, at first, to enter the forensic fellowship; however, I changed my mind after medical reimbursements changed in the early 1980s there were few jobs available in general pathology. Coe accepted me into the forensic fellowship with the simple words, "You're tall enough!" Coe retired as medical examiner the year preceding my fellowship and I was Garry Peterson's first fellow.

During the 1980s, Minneapolis contained one of the most dynamic groups of forensic pathologists in the country and I was fortunate to train there. There was a strong emphasis on forensic toxicology and teaching in forensic pathology. John Coe was active nationally including his involvement in the Kennedy and King Assassination investigations. His annual forensic conference brought the top people in the field to Minneapolis to lecture. Coe was of course known for his work in vitreous fluid analysis helped to a large degree by his access to the hospital lab and Calvin Bandt. Dr. Calvin “Cal” Bandt was the unsung force behind the scenes. He was a board-certified forensic pathologist and supervised and ran the clinical labs at Hennepin County Medical Center. He was the one of the first to recognize the phenomenon of postmortem drug re-distribution.

Garry Peterson MD, JD took over as medical examiner in 1984 following Coe. I became the assistant medical examiner for six months until I left for Milwaukee in 1987 to take the medical examiner job. I became the Medical Examiner for Milwaukee County in 1987, at age thirty-three, one of the youngest medical examiners of a major American city at the time. I intended to stay in Milwaukee for a short time, but quickly fell in love with the city. My later success in Milwaukee was to a large degree because of the almost weekly telephone conversations, “sessions” I had with Garry during the early years of my career, right out of training.

I spent the major part of my career in Milwaukee where I was the medical examiner for twenty-one years before retiring in 2008. The office was staffed with hard-working professionals. My first accomplishment was to recruit Dr. John Teggatz as the Deputy Chief medical examiner. John, who also completed his pathology residency and fellowship training with me at Hennepin County, was a dedicated colleague and friend until his untimely death from cancer.

The toxicology laboratory in Milwaukee was especially prominent. Susan Gock was the toxicologist most responsible for the excellent service and reputation of the lab. Steve Wong, Ph.D., came to Milwaukee in the mid-1990s and provided academic foundation for many of the publications and developed a forensic toxicology fellowship program. Steve developed one of the first forensic pharmacogenomics laboratory (the study of genetic influence on drug deaths) and did extensive work in the field. I have been fortunate to work with dedicated managers, staff and fellows.

In Milwaukee, I was extremely fortunate to have a supportive district attorney and a number of local physicians in the local Milwaukee community who understood the importance of the role of the medical examiner. Over the years we developed child death review teams, a regional medical examiner system with coroners, co-operative relationships with organ and tissue agencies, and public health authorities, and continued the annual two-day forensic seminar similar to those in Hennepin County. The highest profile case I handled was the Jeffrey Dahmer serial killing (1991). Although it received a lot of publicity, it was really more like dismantling a museum. During my time in Milwaukee, I handled a number of other major incidents including, the 1995 Heat Wave Disaster, 2008 Lake Michigan airplane crash, and a number of industrial accidents, serial killers and public health epidemics.

I believe my most lasting accomplishments to the field have been in the area of death investigator education. Certainly, the best thing I ever did professionally was to interest Dr. Steve Clark, a PhD., an educator, curriculum and testing expert in the field of death investigation. Steve is my boyhood friend. The result was a training manual, *The Medicolegal Death Investigator: A Systematic Training Program for the Professional Death Investigator* and development national forensic autopsy standards, which eventually developed into the American Board of Medico-Legal Death Investigation (ABMDI). Since that early project, Steve has made a number of contributions to NAME and forensic medicine including: National Guidelines for Death Investigation and Crime Scene Investigation, certification examinations, NAMUS program for missing and unidentified persons, forensic specialty certification and computerizing the NAME Inspection and Accreditation process and a number of other research programs in death investigation.

I relocated to the University of Michigan in Ann Arbor in 2008 as the Director of Autopsy and Forensic Pathology and Washtenaw County medical examiner. The leadership of the department sought to develop a forensic center of excellence. We eventually embedded the local ME office into the department of pathology. Seeking to develop a forensic fellowship, in 2011 the department took over the responsibility of administering the Wayne County (Detroit)

medical examiner office under Dr. Carl Schmidt. Another local county was added in 2017. The result has been the creation of a regional, academically based medical examiner system in southeast Michigan.

One of my major areas of interest include, medical history. In 2007, after ten years of study, I earned a PhD in the history science from the University of Wisconsin-Madison. The result was the publication, *Death Investigation in America: Coroners, Medical Examiners, and the Search for Reasonable Medical Certainty*, a history of forensic pathology in America during the twentieth century. I have published a number of papers and chapters on the history of death investigation including a forthcoming book, *Instruments of Empire: A Global History of Death Investigation in the Colonial Perspective*.

Medical examiners need special skills and gifts of patience, suspicion, paranoia, and common sense. They need to be public servants that know how to avoid perceptions of conflicts of interest. I learned how to be a public servant from my father Harold, a county engineer, and how to practice medicine from my father-in-law Howard Otto, a pathologist. Over my career, I have developed a number of practices, which I believe would be beneficial advice for forensic pathologists entering the field for forensic medicine.

- The autopsy begins at the scene.
- No guts; no glory. (Make a decision)
- No good deed goes unpunished. (Treat everyone the same.)
- Get your butt out of bed! (Go to crime scenes)
- The chief has to spend time in the autopsy room.
- You don't know how much authority you have until you try and use it.
- The statutes won't save you, use common sense.
- Speak to politicians like you visit with your neighbor over the back fence.
- Always do a complete autopsy.
- Specialize in something.
- If you think about it; Do it!

I am truly humbled and grateful for this Award and the support of my colleagues. I will continue to encourage and extoll the benefits of quality death investigative practices across the country.

NOTES

OPTIONAL MEETINGS/ACTIVITIES

OPTIONAL SATURDAY NAME FOUNDATION OUTREACH FUNDRAISER “Murder, Mayhem and Mystery” [NOT CME]

Date: Saturday, October 13, 2018

Location: Coral Ballroom, Hilton West Palm Beach,
600 Okeechobee Blvd, West Palm Beach, FL

Time: 8:00 PM to 10:00 PM

Cost: Donation

Event description

“Murder, Mayhem and Mystery”

- Chris Milroy, MD, LLB, Director of Forensic Pathology, Professor at University of Ottawa and Chief Examiner in Forensic Pathology for the Royal College of Pathologists and the Royal College of Physicians in Canada

Dr Christopher Milroy is a Forensic Pathologist who has worked in the UK and Canada. During his nearly three decades as a Forensic Pathologist he has investigated hundreds of homicides from the arctic to the tropics, filmed for the BBC on ancient murders and modern mysteries, worked on war crimes in the Former Yugoslavia and has given evidence in hundreds of trials in many countries. In addition, he has been an editor and publisher of many papers and will present a variety of cases illustrating the life and work of a Forensic Pathologist.

The event will serve as an outreach fundraiser for the NAME FOUNDATION to help raise scholarship money for Forensic Pathology Fellows, Pathology Residents, and students to attend and make scientific presentations at the NAME Annual Meeting. As such, attendance at this event will be associated with a small donation and require pre-registration. On-line ticketing and registration will be managed by THE CENTER FOR FORENSIC SCIENCES RESEARCH AND EDUCATION at The Fredric Rieders Family Foundation. Ticket donations are \$10 for students, and \$20 for everyone else. NAME members may wish to opt for a special package deal: with a \$50 donation, NAME members will receive a 1 year NAME Foundation Membership and admission to the event. Pre-registration at

<https://www.eventbrite.com/e/murder-mayhem-and-mystery-name-outreach-fundraiser-tickets-46940701903>

OPTIONAL SUNDAY 21st RIGOR RUN/WALK [NOT CME]

Date: Sunday, October 14, 2018

Time: 6:00 AM

Cost: \$25.00 per person



The NAME Rigor Run/Walk will be approximately 3 miles. The route will start and end at the meeting hotel. Registrants for the Rigor Run/Walk will receive a terrific t-shirt. Runners and walkers can go to the Sunday morning continental breakfast after returning to the hotel. Note: T-shirts will be available on a first come first serve basis. There will be shirts in sizes S, M, L and XL.

OPTIONAL SUNDAY 24th ANNUAL CADAVER OPEN GOLF TOURNAMENT [NOT CME]

Date: Sunday, October 14, 2018

Time: 1:00 PM

Cost: \$60.00 per player



The 2018 Cadaver Open will be held at The Fountains Country Club (<http://www.fountainscc.com/web/pages/golf>). The cost of the round will be \$60/golfer. You can register

for the Cadaver Open online via the NAME website. Please do not wait until the last minute to register as we have to reserve our tee times 3 weeks prior to the meeting. Once we submit our final list, you can only get a spot if another player drops.

Rental clubs are available for \$30/set. Please call the course (561-642-2700) to reserve your rental clubs.

The course is approximately 13 miles from the meeting hotel (<https://tinyurl.com/yaesa47q>).

Team pairings will be announced a few weeks prior to the meeting. If you have a preference for who you would like on your team, please let me know as soon as you sign up.

If you will have a car at the meeting, please contact David Winston at dcwinston@gmail.com to him know how many passengers and golf bags you can transport.

Please bring \$10 cash for prize money to be divided up as prize money for closest to the pin winners and to the winning team.

OPTIONAL LEARN TO LEAD IN FORENSIC PATHOLOGY FROM CHIEF MEDICAL EXAMINERS – BREAKFAST WORKSHOP

Date: Monday, October 15, 2018

Time: 7:00 AM – 8:00 AM

Our greatest forensic leadership resources are our current and past leaders. Develop a deeper understanding of how our Chief Medical Examiners approach challenges and inspire others by attending this moderated interactive question and answer breakfast workshop. Previously titled the Chief's Breakfast, this session will highlight the experiences of three successful Chief Medical Examiners. Topics that will be explored include administration, personnel issues, program innovations, budget management, leadership training, problem solving, and effective leadership styles. Former and current forensic pathology leaders are also invited to attend to share their experiences and interact with attendees who are interested in becoming future leaders.

According to Daniel Goleman's Leadership That Gets Results, a 2000 Harvard Business Review study, there are six leadership styles that effective leaders use. The Authoritative leadership style mobilizes people toward a vision and is considered to have the most positive impact on the organization. The Coercive leadership style demands immediate compliance and has the most negative impact on the organization.

Preregistration is required, but there is no separate fee for this breakfast. Breakfast will be available outside of the meeting room.

OPTIONAL FEMME FATALE LUNCHEON [NOT CME]

Date: Monday, October 15, 2018

Time: 12:00 PM – 1:20 PM

Cost: \$65.00 per person

Femme Fatales (Ladies) - Plan to join your forensic colleagues for lunch and get acquainted. This is a

luncheon for all forensic femme fatales! Register early as space is limited!

OPTIONAL FORENSIC PATHOLOGY-RELEVANT "PATIENT SAFETY" COURSE

Date and Time: Tuesday, October 16, 2018 – 5:15 PM to 8:45PM

Location: Gardenia, Hilton West Palm Beach

Cost: \$75/person (Light Refreshments Available)

This course written and delivered by the members of the NAME Subcommittee for the Development of Self-Assessment Modules (SAMs) is designed to satisfy the American Board of Pathology Continuous Certification (CC) requirement (as specified by the American Board of Medical Specialties) for a Patient Safety Course (PSC). Each diplomate participating in CC (formerly MOC) is currently required to complete an approved PSC once during each 10-year cycle. While there are PSCs offered by other organizations in general medicine and in general anatomic and clinical pathology, this course will be the first that is focused in and specific to forensic pathology. The course will present a number of short modules on a variety of topics relevant both to patient safety and forensic pathology. Topics include critical values in forensic pathology and their management, the autopsy and quality assurance, human factors in error, epidemiology of error, the culture of safety, systems thinking and root cause analysis, and quality improvement and models for improvement. Case examples from the everyday practice setting of Medical Examiners will be used to illustrate. SAM credits will be available.

Space Limited

OPTIONAL YOGA BY DONATION

Date and Time: Sunday, October 16, 2018 (Chair Yoga) – 5:00 PM – 6:00 PM and

Monday, October 17, 2018 – 5:00 PM – 6:00 PM

Location: Gardenia, Hilton West Palm Beach

Cost: Donation, to go to the NAME Foundation. A suggested \$10 donation per class

Dr. Amy Martin will be leading yoga by donation at Hilton West Palm Beach, West Palm Beach, Florida. The afternoon Sunday class will be Chair Yoga and the afternoon Monday class will be alignment flow classes.

Dr. Martin is a RYT-200 certified yoga teacher. No experience necessary. Please bring your own mat if possible.



National Association of Medical Examiners

Abstracts of the 2018 Annual Meeting

October 12 – 18, 2018

Hilton West Palm Beach

West Palm Beach, Florida

NOTES

National Association of Medical Examiners

Abstracts of the 2018 Annual Meeting

October 12-16, 2018

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ORAL PRESENTATIONS

1.1 Fatal Drug Overdoses Involving Carfentanil: A Series Of 430 Cases at the Palm Beach County Medical Examiner Office, 2016-2018

M.D. Bell¹, G.S. Behonick²

¹Palm Beach County Medical Examiner Office, West Palm Beach, Florida, USA; ²AXIS Forensic Toxicology, Indianapolis, Indiana, USA

Carfentanil is a fentanyl analog that is reportedly 100 times more potent than fentanyl and 10,000-100,000 more potent than morphine. It was synthesized in 1974 and used to immobilize large animals. In 2016, carfentanil emerged as a component of encapsulated powder sold to drug users as "heroin." This led to the largest increase in drug fatalities in Palm Beach County with over 400 fatal drug overdoses involving carfentanil, either singly or in combination with other drugs from 2016 to 2018. This presentation will cover the epidemiology, autopsy findings, and toxicology results in these carfentanil-involved deaths. We will also cover the challenges and strategies to detect this potent fentanyl analog that is measured in pg/ml in blood rather than mg or mcg/ml.

1.2 Spleen Blood as an Alternative Specimen to Peripheral Blood for Postmortem Toxicological Analysis

A.L. Lukefahr¹, W. MacKerricher¹, K. Shanks², G. Behonick², D. Winston³

¹The University of Arizona - Tucson, Tucson, Arizona, USA; ²Axis Forensic Toxicology, Indianapolis, Indiana, USA; ³Pima County Office of the Medical Examiner, Tucson, Arizona, USA

Peripheral blood, the preferred matrix for postmortem drug sampling, is not always available given confounding factors such as prolonged postmortem interval. As a reservoir of peripheral blood components, the spleen is an alternative/supplemental matrix for forensic toxicological analysis. However, limited data exists comparing spleen blood and peripheral blood drug concentrations. To assess the toxicologic utility of spleen blood, samples were collected at autopsy when there was a high suspicion for drug overdose as cause of death. Spleens were removed and manually compressed to collect blood, while peripheral venous blood and vitreous fluid were collected via syringe. Samples were analyzed for the presence of amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, fentanyl, methadone, opiates, phencyclidine, propoxyphene, alcohol, analgesics, anesthetics, anticonvulsants, antidepressants, antihistamines, antipsychotics, cardiovascular/endocrine/gastroenterology/neurology agents, narcotics, sedatives/hypnotics, and stimulants. Twenty-six drugs were detected in both peripheral and spleen blood, within the classes of amphetamines, benzodiazepines, cannabinoids, cocaine, methadone, opiates, tramadol, alcohol, antidepressants, antihistamines, and cardiovascular agents. Methamphetamine concentrations (n=4) were higher in spleen (7957.2 ± 3843.4 ng/mL, mean ± SEM) versus peripheral blood (4751.5 ± 3677.1 ng/mL). Amphetamine concentrations were higher in spleen (554.4 ± 218.8 ng/mL, n=4) versus peripheral blood (275.133 ± 114.8 ng/mL, n=3). Morphine (n=4) and 6-monoacetylmorphine (n=2) concentrations were higher in spleen (477.5 ± 148.6 and 81.9 ng/mL, respectively) versus peripheral blood (158.5 ± 44.7 ng/mL and 14.4 ng/mL, respectively). Oxycodone (n=3) and codeine (n=2) concentrations were higher in spleen (3228.3 ± 1295 and 59.9 ng/mL, respectively) versus peripheral blood (551.7 ± 139.5 and 14.8 ng/mL, respectively). Diphenhydramine concentrations (n=3) were higher in spleen (28011.7 ± 26837.2 ng/mL)

versus peripheral blood (4148 ± 3852 ng/mL). Alprazolam concentrations were similar between spleen (39.3 ± 30.51 ng/mL, n=3) and peripheral

blood (39.4 ± 18.3 ng/mL, n=2). Hydromorphone concentrations were similar between spleen (3.6 ng/mL, n=2) and peripheral blood (3.4 ng/mL, n=1). Ethanol concentrations (n=3) were similar between spleen blood (0.23 ± 0.06 % w/v), peripheral blood (0.21 ± 0.04 % w/v), and vitreous fluid (0.27 ± 0.05% w/v). Gabapentin concentrations (n=5) were similar between spleen (18.7 ± 8.6 mcg/mL) and peripheral blood (17.3 ± 5 mcg/mL). THC-COOH concentrations (n=3) were lower in spleen (20.1 ± 7.4 ng/mL) versus peripheral blood (106.5 ± 97.2 ng/mL). To our knowledge, this is the first direct comparison between spleen blood and peripheral blood postmortem drug concentrations. Although limited in scope, this study represents the first step in validating spleen blood for postmortem toxicological testing.

1.3 Forensic Toxicological Analysis of Deaths Due to Drug Overdose A Descriptive Retrospective Study of 1100 autopsies Performed at The Cook County Medical Examiner's Office from January 1st to December 31st, 2017

D.L. Hewa¹, P. Arunkumar², E. Zakariya², B.J. Soriano²

¹Office of the Medical Examiner, County of Cook, Chicago, Illinois, USA;

²Cook County Medical Examiner's Office, Chicago, Illinois, USA

Drug overdose deaths continue to increase throughout the world. From 2014 to 2015, drug overdose deaths increased by 11.4% in the United States.¹ A descriptive retrospective study was carried out on 1100 autopsies of drug related deaths performed at The Cook County Medical Examiner's Office from January 1st, 2017 to December 31st, 2017. Objectives were to assess the age, sex and race; patterns of illicit and prescribed drugs; drug concentrations; prevalence of adulterants; correlation of drug concentration to the time since death; and analytical aspects of the fatalities. Peripheral blood samples collected within 30 hours of death were the most satisfactory samples for drug analysis. Urine was the best sample for 6-MAM detection. Quantitative analytical methods were LCMS/MS, GCMS, GC-GC, and GC headspace. Out of the 1100 cases, 810 deaths were due to single or combined drug overdoses and 298 were due to drugs combined with ethanol. Sex and race demographics were as follows: male, 79%, female, 21%; White, 57.6%; and Black, 41.4%. Individuals younger than 50-years-old accounted for 65% of deaths and individuals younger than 40-years-old accounted for 40% of deaths. Heroin was the most common drug that caused or contributed to death (782), followed by fentanyl and designer opioids (666), cocaine (512), drugs combined with ethanol (298), alprazolam (190), methadone (89), hydrocodone (64), methamphetamine (40), amphetamine (20), oxycodone (18), MDMA (11), hydromorphone (19), phencyclidine (18), MDA (3) and other drugs. 218 cases were positive for cannabinoids. The most commonly detected adulterants included quinine, levamisole, hydroxyzine, lidocaine, ephedrine, norephedrine, midazolam and ketamine. Common over the counter and prescription medications detected in drug related fatalities included diphenhydramine, naloxone, codeine, alprazolam, clonazepam, diazepam and citalopram. Analyses of drug combination patterns and demographic data can be useful public health tools. Data from the Cook County Medical Examiner's Office may aid public health agencies, researchers and law enforcement.

1.4 Protocol for "Real-Time" Surveillance of Drug Overdose Deaths in King County, Washington

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¹King County Medical Examiner's Office, Seattle, Washington, USA;

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Despite being labeled "opioid crisis", overdose data still represent only an historical analysis rather than a useful surveillance tool. The King County Medical Examiner's Office (KCMEO) has developed a "real-time" surveillance methodology in which up-to-date information about probable overdose deaths is disseminated weekly to a network of responding agencies by using the following procedures:

1. Medicolegal death investigators respond to reported deaths, documenting scene and circumstances in reports, photographically recording drugs and medications, and collecting illicit drugs, suspicious substances, and pills that may represent counterfeits.
2. Medical examiner forensic pathologists review scene photographs and investigator reports to determine likelihood of drug overdose. Autopsy examination is performed. Urine is dipstick tested for fentanyl.
3. Drug evidence collected from scene is field tested for various drugs.
4. Using information gathered from scene investigation, autopsy examination, urine and drug testing, cases of high probability for drug overdose are recorded in a weekly and cumulative spreadsheet, including the predicted drugs responsible for overdose.
5. Blood samples from cases of high probability for drug overdose are submitted to the Washington State Patrol Toxicology Laboratory for priority testing with rapid turnaround times.
6. Every week a "KCMEO Drug Overdose Surveillance Bulletin" listing details about the previous week's probable overdoses, along with the predicted drugs causing overdose, and additional information such as photographs of drugs from scenes, results of drug testing, and follow-up of toxicology results is transmitted electronically to a network of federal, state, and local partner agencies in criminal justice and public health.

The model for predicting drug overdoses and the drug(s) responsible was analyzed and found to be highly predictive. Ninety-four percent of cases determined to be "high probability" drug overdose deaths at the time of initial prediction were later confirmed as fatal overdoses by toxicology testing. Predictions of drug(s) identified compared with drug(s) subsequently reported by the toxicology laboratory were at least partially correct in 93% of cases.

Death certificates are useless for "real-time" surveillance of drug overdose deaths. In the extended period between death and final determination of cause of death, the investigation is essentially stalled. However, experienced death investigators and forensic pathologists, when presented with information gathered from the scene, are quite accurate in their ability to predict the drugs responsible for death. Hopefully, rapid reporting of details regarding suspected overdose deaths to public health and law enforcement agencies will make "real-time" surveillance worthwhile for many different agencies

1.5 An Empirical Look at Drugs Detected in Non-Autopsied, Presumed Natural Deaths

R. Seeber, B. McCleskey, D. Atherton

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Forensic pathologists (FPs) determine the cause and manner of death of decedents whose deaths fall under the jurisdiction of a Coroner's/Medical Examiner's Office (CMEO). Autopsies are not performed on all deaths, and FPs consider the Forensic Autopsy Performance Standards published by the National Association of Medical Examiners, scene investigation, available clinical history, postmortem imaging, and their own experience in determining upon which cases to perform autopsies and upon which cases to perform external examinations only. CMEOs often assume jurisdiction of deaths of individuals that die of presumed natural causes but with no known physician on record to complete a death certificate. Frequently, after review of scene findings, reported medical history, postmortem imaging, and an external examination, the decedent's body is released. On occasion, if toxicology is performed, drugs are later unexpectedly detected that complicate interpretation of cause and manner of death. The purpose of this presentation is to report and analyze empirical data about this specific subset of cases from the Jefferson County CMEO.

From 2012 through April 2018, the Jefferson County CMEO assumed jurisdiction of 438 deaths that the FP presumed were natural and elected to perform only an external examination on along with toxicological analysis. Of these, drugs were detected in 69 cases (16%). Of those 69 cases in which drugs were detected, 43 were ultimately ruled natural manners of death, 24 accidental, and two undetermined. Illicit drugs of abuse were detected in 23 of the 24 cases (96%) that were ruled accidental and in seven of the 43 cases (16%) that were ruled natural.

Presumed natural deaths in which external examination only is performed and toxicological analysis results in a toxic level of a prescription drug are rare; only one such case (fluoxetine toxicity) was identified in our search. Not all cases in which illicit drugs of abuse were detected were ruled accidental. These observations and more will be discussed with an emphasis on relating empirical data to FP cognition and judgment.

1.6 Characteristics of Rapid Overdose Deaths, State Unintentional Overdose Reporting System, July 2016-June 2017

M. Kariisa¹, J. O'Donnell², C. Mattson², P. Seth²

¹Centers for Disease Control and Prevention, NCIPC/DUIP, Atlanta, Georgia, USA; ²CDC, Atlanta, Georgia, USA

There were 42,249 opioid-involved fatal overdoses in 2016, a 27.6% increase from 2015. Among those deaths, nearly half (49.5%) involved synthetic opioids other than methadone, in contrast to less than 30% of opioid-involved deaths in 2015. This substantial rise in deaths has been largely attributed to the increased proliferation of illicitly manufactured fentanyl and fentanyl analogs. The high potency of drugs such as fentanyl and carfentanil, estimated at 10,000 to 100,000 times that of morphine, is particularly alarming. Persons using such powerful substances are at an increased risk of death, overdosing rapidly and possibly requiring the administration of multiple doses of naloxone to reverse the overdose. The Enhanced State Opioid Overdose Surveillance (ESOOS) program funds 32 states and the District of Columbia to capture data on non-fatal and fatal opioid overdoses.

One of the goals of ESOOS is to increase the timeliness of reporting of opioid overdoses and their associated risk factors. Information on opioid-involved deaths are captured from death certificates and medical examiner/coroner reports. Data are abstracted into the State Unintentional Drug Overdose Reporting System (SUDORS) and include information about the substances contributing to death and the circumstances associated with these deaths. Elements captured within SUDORS include post-mortem toxicological testing results, evidence of rapid overdose, route of administration, evidence of prescription or illicit drug use, and

prescription information from prescription drug monitoring programs. Using SUDORS data, decedents with evidence of a rapid overdose, a subset of opioid-involved deaths where the onset of the overdose occurred shortly after the administration of drugs, will be identified and analyzed. Rapid overdoses may have a number of shared characteristics and may present unique challenges to overcome overdose response. This presentation will describe these rapid overdose deaths and will include data on decedent demographics, geographic distribution, circumstances surrounding the overdose, and substances that contributed to these deaths. The analysis will focus on overdose deaths that occurred from July 2016 to June 2017. Findings will highlight potential unique characteristics of rapid overdoses and possible barriers to overdose response. Innovative strategies may be required to overcome these barriers.

1.7 Use of Mobile Technology for Real-Time Access to Overdose Data - Public Health and Pharmacology Implications

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The epidemic of overdose deaths continues throughout the United States. Specifics of these deaths vary widely from jurisdiction to jurisdiction. On one hand there is an identifiable belt centered on the Appalachian Mountains and extending into New England where opioids are by far the most prominent problem. In the western states and mid-west, however, methamphetamine is much more of an issue. Within any one region or even specific jurisdictions in the same region, the agents that result in overdose deaths may vary significantly between adjacent states and even between different counties within an individual state.

A recent feature of the opioid crisis is the appearance of novel fentanyl-related substances. Allegheny County, with a population of 1.3 million, and Pittsburgh as its principal city, is centrally located within the opioid belt. It experienced fatal 735 overdoses in 2017 with 574 of the total showing the presence of fentanyl related substances. Of these, 293 showed a fentanyl analogue. Many of these analogues appeared within the last two quarters of the year.

It is essential for any evidence based approach to the resolution of the current crisis that all involved stake-holders from Law Enforcement entities through public health facilities and including the public have access to the most contemporaneous data as possible.

OverdosefreePA (OFPA), part of the Allegheny County Overdose Prevention Coalition (ACOPC), has collaborated with the School of Pharmacy of the University of Pittsburgh (UPMC) to create a publicly accessible and searchable dataset of overdoses results. Toxicology reports are submitted from the Allegheny County Office of the Medical Examiner (ACOME) section of Toxicology and from an additional 30 elected lay-coroner's offices of counties of the Commonwealth of Pennsylvania. These reports are vetted with a standard protocol and then placed on-line after approval by the submitting agency.

Thus, as soon as the toxicology results of an overdose are determined they can be viewed in as close to real-time as possible, generally within a matter of weeks. Recently a mobile app is available for access to these results while away from a computer station. This allows the diverse stakeholders in any one jurisdiction to have access to the most up to date knowledge on their local overdose death as is possible.

1.8 Discerning Drug Mortality Patterns in a Large Database of Toxicology Results

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¹University of Michigan / Wayne County Medical Examiner, Detroit, Michigan, USA; ²Wayne State University School of Medicine, Detroit, Michigan, USA; ³Wayne State University Medical School, Detroit, Michigan, USA; ⁴Michigan State University, Grand Rapids, Michigan, USA

Drug-related deaths have been the single most important source of mortality over the past 5 years. In 2013, there were 450 drug related deaths in Wayne County, Michigan, a number which had not varied by more than 10% in the previous years. In 2016, there were 848 such deaths, and 936 in 2017. Similar patterns have been experienced in other parts of the country, especially due to fentanyl and analogues, but other opiates are often involved. It is common to find multiple drugs in the blood, including nonopioid compounds. We looked at 7731 cases from our office from 2012 through 2016. Over this time period, there were striking changes in both the compounds appearing in the blood, as well as the pattern of drugs found in an individual case. Because a drug screen with confirmation is drawn on almost every case, it was possible to build a database of positive drug results on which CHAID (Chi-square Automatic Interaction Detector) Analysis, a kind of decision tree analysis, could be done. This decision tree allows the prediction of a relationship between a toxicology result and a drug-related vs. a non drug-related death, and reveals patterns within drugs used that are not readily discerned with routine statistical methods. For example, we found a potential deadly interaction between a common antidepressant compound (citalopram) and a specific opioid, and that acetaminophen was highly predictive of a drug death. On the other hand, cocaine in association with levamisole was predictive of a short survival time due to sudden, violent death. Clearly, results like these will have significant regional variation. CHAID analysis, then, by visually stratifying toxicology results, allows discernment of patterns of drug use and even unexpected associations with other causes of deaths. It is a useful tool for epidemiology, especially when drug screening is comprehensive across the spectrum of cases seen in a practice of forensic pathology. These results can also have an impact on drug rehabilitation and mental health programs in the community, since some of the drug markers have no abuse potential and show at least some drug users have contact with a health care provider.

2.1 National Association of Medical Examiners Position Paper: Recommendations for the Investigation and Certification of Deaths in People with Epilepsy

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¹Office of the Chief Medical Examiner, Burlington, Vermont, USA; ²Hennepin County Medical Examiner's Office, Minneapolis, Minnesota, USA; ³University of Alabama at Birmingham, Division of Forensic Pathology, Birmingham, Alabama, USA; ⁴Hospital for Sick Children, Toronto, Canada; ⁵New York University, New York, New York, USA; ⁶Columbia University, New York, New York, USA; ⁷University of New Mexico Health Sciences Center, Albuquerque, New Mexico, USA; ⁸New York University School of Medicine, New York, New York, USA; ⁹Ventura County office of Chief Medical Examiner, Ventura, California, USA; ¹⁰Emory University, Atlanta, Georgia, USA; ¹¹CDC/National Center for Chronic Disease Prevention and Health Promotion, Atlanta, Georgia, USA; ¹²Karolinska Institute/Karolinska University Hospital, Stockholm, Sweden; ¹³University of California, San Francisco, San Francisco, California, USA; ¹⁴Office of the Medical Examiner, Cook County, Chicago,

Illinois, USA; ¹⁵Stormlab Consulting, Burlingame, California, USA; ¹⁶New York University, Department of Neurology, New York, New York, USA

Sudden unexpected death of an individual with epilepsy (SUDEP) can pose a challenge to death investigators, as most deaths are unwitnessed and the individual is commonly found dead in bed. Anatomic findings (e.g., tongue/lip bite) are commonly absent and of varying specificity, limiting the evidence to implicate epilepsy as a possible cause of or contributor to death. Thus, it is likely that death certificates significantly underrepresent the true number of deaths in which epilepsy was a factor. To address this, members of the National Association of Medical Examiners, North American SUDEP Registry, Epilepsy Foundation SUDEP Institute, American Epilepsy Society, and the Centers for Disease Control and Prevention convened an expert panel to generate evidence-based recommendations for the practice of death investigation and autopsy, toxicological analysis, interpretation of autopsy and toxicology findings, and death certification to improve the precision of death certificate data available for public health surveillance of epilepsy-related deaths. The recommendations provided in this paper are intended to assist medical examiners, coroners, and death investigators when a sudden, unexpected death in a person with epilepsy is encountered.

2.2 Correctly Identifying Deaths due to Drug Toxicity without a Forensic Autopsy

D.W. Dye¹, G. McGwin², G.G. Davis¹

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In 2005 the National Association of Medical Examiners (NAME) approved the Forensic Autopsy Performance Standards to provide a constructive framework that defines the fundamental services rendered by a professional forensic pathologist. Standard B3.7 indicates that a forensic pathologist shall perform a forensic autopsy when the death is by apparent intoxication by alcohol, drugs, or poison. This standard was later amended to read, "a forensic pathologist shall perform a forensic autopsy when 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."

From experience, forensic pathologists have observed that examinations of individuals who die from use of alcohol and/or drugs will not have any findings at autopsy that are not directly related to the acute intoxication. Many forensic pathologists refer to this as a "negative autopsy".

The Jefferson County Coroner/Medical Examiner Office (JCCMEO) has observed an increase in our caseload by approximately 10% per year since 2012. This increase is largely due to an increase in deaths due to suspected overdoses. Because of this increase, we explored the value of the forensic autopsy in suspected overdose deaths based on history. For 2017, a total of 629 autopsies were performed at the JCCMEO. All cases with a manner of death of homicide, suicide, and undetermined were excluded. Accidental deaths caused by physical trauma were excluded. A total of 386 cases were used to develop a test for forensic pathologists. The pathologists were asked to determine a cause of death (COD) and manner of death (MOD) based on information from the original case submission form, findings from the external exam, and results from toxicological testing. The determination of COD and MOD was then examined with the COD and MOD from the case file, which includes information from the internal examination and microscopy, to determine agreement between the case file and the re-classification. Kappa values were calculated to assess the agreement between the groups.

Without information from the autopsy, one pathologist was able to achieve moderate agreement ($\kappa=0.57$) between the test cases and the actual COD/MOD. Other pathologists had fair agreement ($\kappa=0.35$). When pathologists were compared to each other the agreement in the COD/MOD was also moderate ($\kappa=0.57$). These findings indicate that a full postmortem examination is necessary to correctly classify the COD/MOD in cases of suspected drug toxicity in a medical examiner office.

2.3 Death Certification Errors and the Effect on Mortality Statistics

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¹Office of the Chief Medical Examiner, Burlington, Vermont, USA; ²Robert Larner, MD College of Medicine, University of Vermont, Burlington, Vermont, USA

Objective: Errors in cause and manner of death on death certificates are common and affect families, mortality statistics, and public health research. The primary objective of this study was to characterize errors in the cause and manner of death on death certificates completed by non-Medical Examiners. A secondary objective was to determine the effects of errors on national mortality statistics.

Methods: We retrospectively compared 601 death certificates completed between July 1, 2015, and January 31, 2016, from the Vermont Electronic Death Registration System with clinical summaries from medical records. Medical Examiners, blinded to original certificates, reviewed summaries, generated mock certificates, and compared mock certificates with original certificates. They then graded errors using a scale from 1 to 4 (higher numbers indicated increased impact on interpretation of the cause) to determine the prevalence of minor and major errors. They also compared International Classification of Diseases, 10th Revision (ICD-10) codes on original certificates with those on mock certificates.

Results: Of 601 original death certificates, 319 (53%) had errors; 305 (51%) had major errors; and 59 (10%) had minor errors. We found no significant differences by certifier type (physician vs non-physician). We did find significant differences in major errors in place of death ($P < .001$). Certificates for deaths occurring in hospitals were more likely to have major errors than certificates for deaths occurring at a private residence (59% vs 39%, $P < .001$). A total of 580 (93%) death certificates had a change in ICD-10 codes between the original and mock certificates, of which 348 (60%) had a change in the underlying cause-of-death code.

Conclusions: Error rates on death certificates in Vermont are high and extend to ICD-10 coding, thereby affecting national mortality statistics. Surveillance and certifier education must expand beyond local and state efforts. Simplifying and standardizing underlying literal text for cause of death may improve accuracy, decrease coding errors, and improve national mortality statistics.

2.4 An Assessment of Protocols, Practices, and Needs for Sudden Unexpected Infant Death Cause-of-Death Determinations-2014

C. Cottengim, S. Parks, C. Shapiro Mendoza

Centers for Disease Control and Prevention, Atlanta, Georgia, USA

Introduction:

A thorough case investigation (death scene investigation, medical history review, and autopsy) is critical to assigning cause and manner of sudden unexpected infant deaths (SUID). We surveyed death certifiers in order to better understand the extent to which death scene investigation and

autopsy protocols are available and followed, and to identify death certifiers' resource needs in improving their capacity to conduct complete case investigations and make accurate cause-of-death determinations for SUID.

Methods:

We conducted a nationally representative survey of US medical examiners, coroners, and other death certifiers (MEC). Of the 801 surveys mailed, 60% were returned, and 47% were deemed complete and are included in analyses. MECs were asked to complete demographic information as well as questions about individual and jurisdictional practices, policies, and additional needs for investigating SUID cases. Analysis of text response variables was facilitated by collapsing like responses using a group consensus process. We calculated the frequency and weighted percentages for both discrete variables and grouped text responses.

Results:

Respondents included coroners (57%), medical examiners (23%), and other titles (19%). Most MECs (92%) reported working in offices with standardized death investigation protocols. CDC's Sudden Unexpected Infant Death Investigation Reporting Form (SUIDI-RF) was used most frequently (47%) for recording relevant information; 33% of MECs reported using a SUIDI-RF-based protocol. Three-quarters of MECs reported working in offices that require them to take infant death investigation training. More than 90% of MECs reported routinely conducting each of the following: witness interviews, taking scene photos, reviewing infant medical history, and completing autopsies. More than a quarter (28%) reported routinely conducting scene re-creations with a doll. Other practices were reported as being completed on a case-by-case basis: x-rays (58.5%), scene re-creation without (43%) a doll, and review of 911 calls (57%). Nearly two-thirds (63%) indicated that additional infant death scene-related training would be beneficial. Resources for genetic testing were the most frequently (68%) reported need to potentially improve autopsies.

Conclusion:

Although most MEC offices have SUID investigation protocols and infant death training requirements there is variability in protocols used, training requirements, and procedures performed as part of SUID investigations. Most MECs indicated needs for additional resources and training in this area. Understanding these needs and the extent to which standardized practices and protocols are available and implemented in MEC offices can ultimately improve the reliability and consistency of SUID cause-of-death determinations.

2.5 Evaluation of Autopsy Findings, Investigative Information and the Determination of Betahydroxybutyrate (BHB) Concentrations in Certifying Deaths from Cold Exposure

M.D. Eckhardt¹, P. Arunkumar¹, D.S. Isenschmid², B.K. Logan²

¹Cook County Medical Examiner's Office, Chicago, Illinois, USA; ²NMS Labs, Willow Grove, Pennsylvania, USA

It can be challenging to determine the cause of death in suspected cold exposure deaths as the factors relating to it are mostly circumstantial and gathered during the investigatory stage. There are a few anatomic findings of cold exposure, but these are nonspecific and their absence does not rule out cold exposure as the primary cause of death or a contributing factor.

Recently studies have been done to determine if betahydroxybutyrate (BHB) elevation can help to bolster the findings seen at autopsy. These

studies hypothesized that an increase in fat breakdown, as a marker of attempted thermoregulation, would cause ketogenesis which would be seen as an increase in BHB and acetone. We chose to look at a series of suspected cold exposure related deaths in Cook County, IL to test the hypothesis.

We searched the Cook County Medical Examiner's Office LabLynx case management system for cases related to cold exposure between October of 2017 and March of 2018 and found 35 cases in which cold exposure was cited on the death certificate as either the cause of death or a contributing factor, and in which a full autopsy was done and a BHB test was ordered. Additionally, as control cases we selected cases in which BHB was ordered but cold exposure was not implicated.

Review of the investigative information, autopsy reports and photographs was performed for the presence of signs of hypothermia including whether the body was frozen, distribution and characterization of lividity/evidence of frostbite, Wischnewsky spots, and pancreatic hemorrhages. Additionally, ambient temperature and, where available, core body temperature of the decedent prior to their demise were collected and reviewed.

Because BHB can be elevated in other circumstances such as diabetes mellitus or chronic ethanolism, we reviewed the investigative reports and medical records for evidence of these conditions and conducted a review of the autopsy reports for any mention of gross or microscopic liver disease.

The project provides insight into the most useful case history information, autopsy findings and the utility of laboratory tests in the determination of deaths from cold exposure.

2.6 Suicidal Carbon Monoxide Poisoning by Formic and Sulfuric Acid

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In 1987, a case report in Germany (Archiv für Kriminologie) described an apparently novel method of suicide where the decedent produced a lethal amount of carbon monoxide by mixing formic acid and sulfuric acid. This method remained obscure until 2002, when Dr. Philip Nitschke, a vocal supporter of euthanasia, developed and promoted a homemade carbon monoxide generator based on the same chemical reaction. Since that time, numerous pro-suicide websites and publications have elaborated upon the method, providing readers with detailed instructions. There have been nine official reports of suicide by this method in the scientific literature with five reported in Europe, three in the United States, and one in Taiwan. Two additional U.S. cases were reported in news articles that do not correspond to known case reports, indicating that this method of suicide is more common than the scientific literature would suggest.

We present the case of a 44-year-old Caucasian male found dead inside his vehicle with an apparent "suicide kit" assembled on the adjacent floorboard. Within the vehicle were two empty bottles of a sulfuric acid-based drain cleaner, one nearly empty bottle of formic acid, a 500 mL separatory funnel secured to a ring stand, and a large bowl beneath the funnel containing a cloudy clear liquid. According to first responders at the scene, the decedent displayed frothy material emanating from the mouth, patchy red spots on his fingers, and minimal discoloration of the face and chest. They also noted an "ammonia bleach" odor within the vehicle.

An industrial carbon monoxide monitor was positioned on the dashboard of the vehicle along with a laptop computer. It was later discovered that the decedent had filmed the incident using the laptop computer, periodically reporting carbon monoxide levels prior to becoming unconscious (less than nine minutes after mixing began).

At autopsy the following day, the body displayed cherry red and partially blanching lividity over the head, upper chest, back, and legs. There was mild cardiomegaly (420 g), and sectioning of the organs revealed dark red parenchyma of the lungs, liver, and spleen. The lungs were moderately congested and edematous. The postmortem blood toxicology revealed a carboxyhemoglobin level of 83%. The remaining toxicology tests were negative.

2.7 Death in a Carbon Dioxide Therapy Bath

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Carbon dioxide (CO₂) therapy is the subcutaneous or transcutaneous administration of CO₂ for therapeutic purposes. In the clinical setting, CO₂ is infused into the affected area for localized lipolysis, and treatment of chronic wounds or other skin conditions. It is considered to be a safe, alternative or complementary medical treatment. Full-body CO₂ baths are offered in spa centers in Europe, in which the clients are placed into full body bags with only their heads sticking out, and CO₂ gas is infused into the bags with an optimal gas concentration between 1000 and 1400 mg/L obtained. Currently, persons can purchase commercially manufactured, air-tight bags and accompanying apparatus designed to provide CO₂ baths in the comfort of their homes. The Center for Disease Control (CDC) has designated 100,000 ppm (or 196 mg/L) of carbon dioxide as immediately dangerous, and exposure to lower levels, starting at 84,000 ppm (or 164 mg/L) for 60 minutes as potentially fatal. The deadly properties of CO₂ are used for the euthanasia of wild and laboratory animals as it requires no injection, handling, or transfer, is painless and relatively safe to the technician. Few human CO₂-related deaths have been reported. They have been mostly accidental, consisting of persons trapped in a closed environment in the presence of "dry ice" or solid carbon dioxide. There have been no reported deaths of a human undergoing a CO₂ therapy at home. We present a case of a middle aged male health enthusiast who was found at home completely inside an air-sealed CO₂ therapy bag wrapped tightly around his body. The bag was connected to a working pump attached to a CO₂ gas tank. The pump was connected to the bag by two tubes, creating an inflow and outflow circuit. The in-flow tube for CO₂ gas delivery was partially disrupted, while the out-flow tubing was intact. The autopsy and toxicology were unremarkable apart from moderate decomposition. The "CO₂ therapy bath" was purchased on-line through a company that sells at home CO₂ therapy devices. The empty gas tank was purchased on-line and filled through a local welding supply center. The occupant inadvertently slipped inside the bag and was completely enveloped. The cause of death was determined to be asphyxia by vitiated atmosphere as evident by the displacement of oxygen by CO₂ and low pressure created inside a "CO₂ therapy bath". The manner of death was accident.

3.1 Best Practices for Talking about Suicide with Media and Families

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Suicide cases are often emotionally charged and at times can require caution in communicating with the media and family members. Research from around the world has demonstrated an increased risk of suicide contagion based on media reports of suicide and, at times, that can be impacted by statements made by Medical Examiners/Coroners to the press. The most recent and relevant research on this topic found a nearly 10% increase in suicides following the death and reporting on the suicide of Robin Williams. Particularly noteworthy in the William's case included the circumstances and statements made by the Coroner the day following his death, which led to an increase in deaths by suicide using the same method atypical for any other similar timeframe prior or subsequent to the August, 2014 death. (Fink DS, Santaella-Tenorio J, Keyes KM (2018) Increase in suicides the months after the death of Robin Williams in the US. *PLoS ONE* 13(2): e0191405.

<https://doi.org/10.1371/journal.pone.0191405>.) Further, given the nature of the death being by suicide, families face stigma, questions and other grief reactions that can also be influenced by statements made by MEs/Coroners (e.g. fears about life insurance, disclosure to children, etc.). While there are differing laws and regulations across jurisdictions in the United States, to date there have been no best practice guidelines for talking with the media or families after a suicide. In an effort to help reduce the risk of contagion occurring due to the field lacking guidance on the issue, experts were convened, published research and similar documents were reviewed, and a consensus model was applied to develop a set of best practices. This presentation will present the development process and best practice guidelines.

3.2 Utility of a Handheld Blood Ketone Meter as a Postmortem Indicator of Diabetic Ketoacidosis

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Diabetic ketoacidosis (DKA) is a serious and potentially fatal complication of diabetes mellitus often seen in type I diabetics and occasionally in type II diabetics with poor glycemic control. The typical symptomatic history garnered from living patients may not be available to the death investigator and/or coroner/medical examiner. When investigating a death that may be due to DKA, it is challenging to assess glucose levels in the blood, but β -hydroxybutyrate, the most prevalent ketone body in the blood in DKA, is relatively stable after death. We aim to prove that a commercially-available, handheld ketone meter could be used on postmortem blood samples and will present cases in which results assisted diagnosis. Samples with acetone detected via gas chromatography were chosen retrospectively to determine if the meter could detect ketones in postmortem blood. A ketone level of 1.5 mmol/L indicates a risk for high blood glucose levels and diabetic ketoacidosis. In cases of DKA, the ketone meter indicated a level between 4.2 mmol/L and 8 mmol/L. The vitreous glucose concentrations available were greater than 300 mg/dL (range: 340 – 781) in these cases. In other cases with increased ketones, the causes of death were related to chronic alcohol use or heart disease. Cases were then chosen prospectively to establish controls as well as cases in which diabetic ketoacidosis was a possible cause of death. We were able to correctly identify 5 cases in which death was due to DKA. The ketone levels ranged from 2.6 mmol/L to 4.6 mmol/L. The diagnosis was confirmed by obtaining a vitreous glucose concentration or the glycated hemoglobin concentration. In one case, use of the meter helped identify a suspected toxicological related death as a natural manner with the death being due to DKA. Detecting the presence of ketones while in the autopsy suite allowed for more accurate preliminary diagnoses and utilization of resources. The meter was useful in triaging the daily case load as well as determining which ancillary tests to order (basic metabolic panel (BMP) on vitreous humor, for example).

This handheld meter could be utilized by coroners and death investigators at the scene to more accurately assess decedents with a history of diabetes or the presence of insulin and syringes at the scene. By utilizing the ketone meter to assist in the diagnosis of DKA for natural deaths, we can improve vital statistics data and increase accuracy of mortality data associated with diabetes.

3.3 Application of the Drowning Index to Opioid and Multidrug Intoxication Deaths: a Retrospective Analysis

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Introduction: Drowning deaths present a challenge for forensic pathologists, because the autopsy findings – namely pulmonary edema and “heavy lungs” – may occur in many non-drowning scenarios, including some deaths not traditionally considered asphyxial in nature (like acute opioid intoxication). Previous studies have attempted to identify patterns in organ weights that may be specific for drowning. Nishitani et. al. (2006) defined the drowning index (DI) as the weight ratio of the lungs and pleural effusion fluid to the spleen, and suggested that it may be useful in confirming drowning as the cause of death. Sugimura et. al. (2010) found that a DI greater than 14.1 is specific for drowning when compared to mechanical asphyxia and acute cardiac death. To our knowledge, no studies have yet compared autopsy findings in drownings and other “traditional” asphyxial deaths to those in drug-related deaths, in spite of their qualitative similarities.

Materials and Methods: We compared the lung and pleural effusion weight, spleen weight, and drowning index from 418 forensic autopsy cases ruled as drowning, opioid or multidrug intoxication, or asphyxia due to hanging at the Office of the Chief Medical Examiner in Columbia, Missouri from 2013-2015.

Results: We found that opioid overdoses result in heavier lungs and spleens than do drownings, multidrug overdoses, or hangings, and that there is no drowning index value at which a death can be definitively ascribed to drowning. The median drowning index was significantly higher in drownings than in opioid intoxications, multidrug intoxications, or hangings ($p=0.011$; $p=0.017$; $p=0.045$). However, very few drowning cases (4/33, or 12.1%) of drownings were associated with a DI >14.1. Additionally, many opioid and multidrug overdoses were also associated with a DI >14.1. The highest calculated drowning index value (DI =33) was associated with a multidrug intoxication case.

Conclusion: In our opinion, the drowning index has no applicability in distinguishing between asphyxial or “asphyxial-like” deaths, including those associated with acute drug intoxication.

3.4 U-Shaped Pillows and Sleep Related Deaths: 2004-2015

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Introduction: Soft objects and loose bedding, including u-shaped pillows, in an infant’s sleep area are risk factors for sudden unexpected infant death (SUID). U-shaped pillows are sold commercially and marketed to assist in breast and bottle feeding. Warnings on u-shaped pillows state that they should be used under adult supervision and should not be used for sleep.

Methods: We describe demographic characteristics of SUID where u-shaped pillows were in the sleep area. We also provide detailed case summaries for infants where the pillow directly contributed to infant airway obstruction leading to suffocation. To identify SUID cases, we reviewed

infant deaths (<365 days old) from all causes in the National Fatality Review Case Reporting System (NFR-CRS) from 2004-2015 (N=51,141). Records were searched for evidence of a u-shaped pillow in infant sleep areas. Search terms included pillows described as u-shaped, nursing, horseshoe, doughnut, and commercial product names for u-shaped pillows. Cases classified as *Explained Suffocation with Unsafe Sleep Factors*, per the Centers for Disease Control and Prevention’s SUID Case Registry classification system were examined in greater detail. Results: Of the 51,141 infant deaths in the NFR-CRS over 12 years, 171 were reported to have u-shaped pillow in the sleep area. Eighty-two percent of these infants were placed on the u-shaped pillow or with the pillow around their head. The highest percentage of cases were less than 6 months of age (88%), male (58%), non-Hispanic white (53%), born at term (66%), and had Medicaid insurance (47%). Infants from twin gestations accounted for 8% of cases; there were no instances where both twins died. Of the 9 deaths classified as *Explained Suffocation with Unsafe Sleep Factors*, four had the u-shaped pillow fully obstructing the airways and five had the airway obstructed when the infant rolled off the pillow and ended up with his or her face pressed into another soft object. Conclusion: Although infrequent, infant deaths have occurred with u-shaped pillows in their sleep area despite product warnings and safe sleep recommendations. This analysis not only underscores the importance of parents and caregivers following all precautions on product packaging and warning labels and safe sleep recommendations, but also the importance of the detailed documentation of the sleep environment during the death investigation. It is through the dedicated work of and collaboration with the medicolegal community that we can better understand unsafe sleep environments and use this information to prevent future deaths.

3.5 Is DNA Banking a Viable and Successful Support Program for Families of Sudden Child Death?

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The SUDC (Sudden Unexplained Death in Childhood) Foundation provides advocacy services for DNA Banking when a child’s death occurs. To better understand DNA banking interest among bereaved families registered with the SUDC Foundation and our ability to obtain viable DNA biospecimens from the Medical Examiner/ Coroner Community for genetic testing, we analyzed 36 referrals over a seven month period of time. The SUDC Foundation’s family advocate contacted interested families to pursue banking. Twenty Five or (70%) of families expressed interest, of which, 17 or (68 %) followed through to complete DNA Banking by completing all paperwork needed to successfully bank samples. We explored all potential biospecimens retained by the Medical Examiner/Coroner’s office that they were willing to release for DNA banking. If no specimens were available, we accessed the child’s newborn screening card for potential source of viable DNA. Fifty Three percent were purple top (EDTA) tubes, 24% were gray top (Sodium Fluoride) tubes, 12% were frozen fresh tissue and 11% other sources such as blood spot cards or blood without preservatives. The extraction outcomes for all specimens were then rated with excellent, good, fair or poor depending on how well DNA was extracted from them based on quantity, ng/ul and quality, base pair size and absorbance ratio. The results were as follows, purple top (EDTA) tubes received an excellent to good rating, gray top (Sodium Fluoride) tubes were rated good to poor, fresh frozen tissue was excellent to good and other sample types were variable. Of the SUDC families that completed DNA banking, 13 or (76%) went on to pursue genetic testing through the SUDC Registry and Research Collaborative

(SUDCRRC) (www.sudc.org). Six or (46%) attained successful whole exome sequencing as a result to date.

In conclusion, we found DNA banking is a viable support service to offer families affected by sudden death. DNA banking preserves the opportunity for samples to be analyzed clinically or through research options.

3.6 A New Path Forward: The Use of Social Media Platforms by Forensic Specialists for Education, Public Outreach and Epidemiological Considerations

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The use of social media (Twitter, Facebook, Instagram, etc) has gained increasing popularity among non-forensic medical specialties in recent years. While visually-oriented specialties such as radiology and surgical pathology have enjoyed a profound increase in users and shared cases, forensic pathology and related specialties have been to this point under represented in cyberspace. An opportunity now exists to use social media platforms for an improved environment of collegiality. Social media provides the framework for connecting with other forensic specialists, both regionally and globally. Thus, 'forensic presence' on social media has implications for education, outreach to the public and epidemiology. Case elements (such as photos) can be shared in an instant, providing both educational opportunities and 'real time' feedback from other forensic experts. The proper decorum of case-sharing is reviewed, as we list guidelines for protecting patient identity as well as avoiding the possibility of legal jeopardy with sensitive cases. In addition, the development of a social media presence not only allows for the ability to connect with forensic specialists around the world, but may be a conduit to public outreach. Never before has the general public had the chance to have such broad access to forensic specialists, and this has far-reaching implications for overall improvement of community health through education. Finally, there are epidemiological considerations, particularly with the possibility to track geographic trends, as is often the case with new formulations of illicit substances or emerging occupational or infectious diseases.

Social media is a new path forward in the continued evolution of the forensic specialties. The advent of the widespread use of smartphones and easily accessible applications ('apps') allows for the rapid sharing of information and development of broad-reaching interconnectedness, all from the palm of one's hand.

3.7 Examining Youth Street Gangs: A Rising Safety Problem Confronting Medical Examiners/Coroners

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Youth street gangs throughout the United States continue to terrorize the neighborhoods that they claim as their own, causing the citizens in these gang infested neighborhoods to live in constant fear of their lives every single day. As a result of the recent influx of gang violence and gang related homicides in all communities, the safety of those first responders and investigators at the scene are put in jeopardy. Leaving the medical examiners/coroners, death investigators, and detectives as possible targets of intramural shootings just because they are at the scene. Gang violence has risen 35% between 2016-2017 and in some communities, gang violence has reached as high as 68%. No one is immune from the violent criminal activities of street gangs. There are over 28,800 gangs in the United States with a total gang membership of 950,000. 90% are male and 10% are female. The ethnic composition nationwide include: 47% Latino, 31% African-American, 13% Caucasian, 7% Asian, and 2% "mixed race" according to the Office of Juvenile Justice and Delinquency Prevention of the US Department of Justice. This study identified 8 distinct

manifestations of youth gang violence and 12 ethnic differences and similarities among African American, Latino, and Asian American gangs. A sample of the findings include: distinct cultural differences between African American, Latino, and Asian American gangs; state of mind (motivation) of the various gangs; drugs; weaponry; killing over turf/territory (gang typologies); extortion; defacing property/graffiti (non-verbal communication); women in gangs. The purpose of this paper is to present timely data on youth gangs; offer strategies on how to recognize and interpret various tattoos and graffiti associated with different youth gangs, which could assist the medical examiner/coroner, death investigator, and detective in the positive identification of the decedent out in the field and/or in the autopsy room. Most importantly, it is imperative that the medical examiner/coroner and law enforcement communities understand the "signs and symptoms" of various youth gangs in order to keep themselves and those around them safe when investigating the deaths of these gang members.

3.8 Opioid-Related Deaths in Eastern Ontario from 2011 to 2016

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There has been a growing opioid crisis in the United States and Canada; prevention strategies are being developed to try to reduce the number of opioid deaths. The aim of this study was to analyze trends in opioid-related deaths from the Eastern Ontario Regional Forensic Pathology Unit which provides Forensic Pathology services to a population of approximately 1.4 million people. The analyses included examining the opioids involved and demographic characteristics of the individuals in these deaths so that possible risk factors for opioid related deaths could be identified.

A retrospective cross-sectional analysis of full autopsy and toxicology data between 2011 and 2016 was conducted. A search of the Unit's electronic database identified drug related deaths; records were then selected if one or more opioid drugs were part of the cause of death statement. Data extracted included demographic details on the decedent, the cause of death and all drugs reported in the toxicology report. Manner of death was retrieved from the provincial database and also used in the analyses. Trends regarding the opioids involved in the death, all opioids reported in the toxicology reports and certain non-opioid drugs reported in the toxicology reports were examined. The distribution of opioid-related death by age group and manner of death was also conducted.

In total, 274 opioid-related deaths met the inclusion criteria and were examined. We found that the majority of individuals overdosing were male (66%). The majority of opioid related deaths occurred in those aged 45-54 years (27%) with an increase in deaths among individuals aged 55 years and older. Fentanyl was responsible for most deaths overall when single or multiple opioids were involved however hydromorphone involvement was the only opioid to have a statistically significant increase over the time period ($p=0.02$). Analysis of non-opioid related drugs revealed a high percentage were also positive for antidepressants, benzodiazepines and their metabolites. Accidents were the most common manner of death throughout all age groups except for those aged 65 years or older where suicide was the most common manner of death.

The results of this study indicates prevention strategies need to include individuals 55 years and older. Strategies should aim at persons who are co-prescribed antidepressants and benzodiazepines with opioids. Older individuals at risk for suicide should be prescribed opioids with caution.

3.9 Bound and Burned in Detroit

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Wayne County is located in the Southeastern corner of the state of Michigan with a population of nearly 1.8 million. The city of Detroit is located in Wayne County. In 2017, there were a total of 287 homicides, which is a rate of 40 per 100,000 people (the nationwide rate is about 5 per 100,000). At the Wayne County Medical Examiner's Office (WCMEO) we found a recent cluster of autopsy cases where the bodies were found with bound extremities and inflicted thermal injuries, presumably an attempt to alter the physical findings.

We searched the WCMEO autopsy database from 2007-2018 to find all cases with both thermal injuries and bound extremities. There were 176 cases with thermal injuries where the manner of death was ruled a homicide. Twelve (12) of these cases were found to with bound extremities.

We report 12 cases that were found to have both thermal injury and bound extremities. Two (2) of the cases were female and 10 were male and 2 were white and 10 were black. The average age of 11 of the cases was 39 years. The remaining case is unidentified. The cause of death in 8 of the cases was determined to be due to the single (25%) or multiple (42%) gunshot wounds, one case was strangulation (8%) and one case was suffocation (8%). For the remaining 2 cases the cause of death was unable to be determined (17%). That burning happened after death was based on a postmortem carbon monoxide determination. All cases had postmortem radiology.

Wayne County in southeastern Michigan is a location where homicide is common, with numerous variations even among the most frequent kind, that due to gunshot wounds. We reviewed 12 homicides with both thermal injuries and binding of the extremities and we conclude that the post-assault burning of a body does not usually obscure the injuries that caused death. A pubmed search yielded only one other systematic review of these kinds of cases in Turkey. A similar search on Google revealed individual anecdotal cases, but not a systematic review of their characteristics. The presentation addresses this gap and will include objective scene and autopsy findings.

4.1 If You Want to Save Lives, Start with the Dead: Epidemiologists and Medicolegal Death Investigators Unite to Stop Suicide Using Novel Surveillance Methodology

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Suicide was identified as a top health issue in Washington County, Oregon after a Community Health Needs Assessment. Public Health Administrators requested data to target suicide prevention efforts. Epidemiologists assessed county-level data and determined better data were needed to guide prevention efforts. An unprecedented partnership was formed. County Epidemiologists shadowed the Medicolegal Death Investigators (MDI) to nearly every death in the county for two years. This partnership demonstrated the richness of information collected in a death investigation to the epidemiologists, and the MDIs saw the critical nature of their work for informing public health action. Together, the programs developed a novel data collection instrument which evolved to a surveillance system that has inspired collaboration between MDIs and epidemiologists across the country.

The novel real-time suicide surveillance system is called the Suicide Risk Factor Surveillance System (SRFSS). In contrast to the National Violent Death Reporting System (NVDRS), information in SRFSS is entered within 24 hours by the MDI responsible for the suicide investigation. SRFSS contains 41 risk factors and circumstances associated with suicide that match the NVDRS including: depressed mood, eviction problem, addiction issues, mental health diagnosis and school crisis in the previous two

weeks. Comparing risk factor and circumstance prevalence for matching deaths in SRFSS versus the NVDRS revealed significant differences in estimates. The NVDRS underestimated the true prevalence of suicide risk factors by over half.

The timeliness and accuracy of the data provided by the MDIs detected a youth cluster of suicide over a week before it was recognized through standard processes. This allowed the county to engage in postvention efforts within 12 hours versus the usual three days. Additionally, extensive training has been conducted based on patterns noticed by our MDIs. For example, people were surrendering their healthy pets at the county shelter before they killed themselves. The MDI notes field in SRFSS demonstrated this was a repeated pattern so the county trained every employee at the shelter in the evidence-based Question Persuade Refer approach for suicide prevention. In the last year alone, veterinary staff have identified at least three people who were going to kill themselves, and connected them with the crisis line based on this training. Good data can save lives. Jurisdictions wishing for timely, actionable and accurate data should consider partnering with their medicolegal death investigators to enhance surveillance efforts, as they are the key to true public health action.

4.2 Interface Astroglial Scarring, a Pattern of Brain Damage in Blast-Exposed Service Members with Prominent Persistent Behavioral/Neurologic Symptomatology, Including Suicide

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Since 2001, approximately 2.6 million U.S. service members have been deployed to the Middle East in the war on terror. Almost daily, allied forces encountered attacks with high explosives, resulting in traumatic brain injuries, including mild TBIs or concussions. These blast TBIs have been called the "invisible wound", since affected service members suffer from debilitating persistent neurologic and behavioral symptoms, but without associated demonstrable biomarkers, such as abnormalities on routine neuroimaging. Thus, the underlying tissue substrate of military Post-Traumatic Stress Disorder (PTSD) has remained undefined. At the Uniformed Services University, we have developed the Center for Neuroscience and Regenerative Medicine Brain Tissue Repository. Within this facility, we have identified a distinct and previously unappreciated pattern of damage to the human brain in blast-exposed cases (see *Lancet Neurol.* 2016 15:944-953). This foundational study demonstrated interface astroglial scarring (IAS), indicative of neuroanatomical areas with damage, in a distinctive pattern occurring at the boundaries of tissues with differing densities, for example, between cerebrospinal fluid and brain parenchyma (subpial) and between the gray and white matter within brain parenchyma.

Many of the specimens with IAS in our repository are from Special Forces Combatants with blast exposure who subsequently showed significant neurological/behavioral symptomatology, diagnosed and treated as Post-Traumatic Stress Disorder (PTSD), and who went on to commit suicide. Of note, these IAS cases, as well as others noted among specimens undergoing routine evaluation at the New York City Office of the Chief Medical Examiner, showed limited or no evidence of the pathologic *tau* accumulation seen in chronic traumatic encephalopathy (CTE), a disorder mostly encountered following repeated impact TBI. These data suggest that the clinical PTSD phenotype of persistent neurologic/behavioral symptoms, particularly as seen after blast exposure, may be due to specific neuropathophysiology, differing from that seen in non-blast (impact) forms of TBI. The IAS case findings are currently under

comparison to brain specimens derived from patients with histories of impact TBIs (in the absence of blast exposure), and age-matched non-military suicide cases.

We emphasize the key role to be played by Medical Examiners in identifying potential cases of IAS, by referring for or conducting detailed neuropathologic examination of all brain specimens derived from military personnel who display significant persistent behavioral/neurologic symptomatology, whether formally diagnosed as PTSD, especially those who commit suicide. Careful pathologic characterization will then allow correlation with neuroimaging and other biomarkers, for eventual *in vivo* application.

4.3 In Good Hands? Death of a Child due to Intentional Immersion in Hot Water and the Resulting Complications

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The majority of cases of infanticide or child murder are caused by a sudden violent act brought on by a slight or trivial provocation. Some caretakers use immersion into hot water as a disciplinary measure, especially in children who are toilet training. There is frequently a delay between the time of injury and medical care being sought, usually with the caretaker claiming the burn was the result of an accident and not to have realized the severity of injury.

We present the case of a 2-year-old male who was removed from his biological parents by Child Protective Services and placed under the care of his paternal grandmother. Per her report, she filled a bathtub with hot water to mop the floor, left the room briefly, and returned to find the decedent unclothed and sitting in a puddle of water on the floor. There were notable burns to his legs and hands, which she treated with cream and gauze. Over the next few days she observed burns to the genitalia and buttocks, which she also self-treated. After six days, she called 911 when the child became lethargic and his eyes rolled back. At the hospital, he was found to have extensive burns that appeared to be 6-8 days old and internal abdominal bleeding. On hospital day five, he had an abrupt drop in hemoglobin and coded. He could not be resuscitated.

At autopsy, external examination revealed full- and partial-thickness burns of the hands, genitalia, buttocks, lower legs, and feet, covering an estimated 21% of total body surface area in patterns typical of those seen in intentional immersion in hot water. Internal examination revealed a perforated duodenal ulcer and blood in the stomach, small intestines, and distal colon. The cause of death was determined to be complications of thermal burns, and the lack of medical care for a week following the injury contributed to the severity of complications. The manner of death was homicide.

The incidence of acute gastroduodenal ulcers that develop in burn patients, or Curling's ulcers, has decreased dramatically with early medical intervention. When medical treatment is delayed, the result can be catastrophic. With this case, we will discuss the classic pattern of burns seen with intentional immersion in hot water, the complications that can arise with delayed medical treatment, and the importance of thorough scene investigation.

4.4 Differentiation between Cranial Trauma and Post Mortem Cranial Expansion in the Skeletonized Remains in Infants and Young Children: A Case Study of an Approximate Two Year Old Male Child

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Examination of the badly decomposed or skeletonized remains of an infant or a young child can be a very difficult task. In many instances the

examination of such a young individual is fraught with many problems as the quick degradation of their small organs, the numerous bones of small size, and relatively minimal degree of ossification which make them extraordinarily subject to breakage through rough handling or movement. One of the primary sites of trauma commonly encountered in infants and young children in a forensic setting is the head. Trauma to the head can result from a great variety of circumstances including falls, impact to the head from an object, and forced contact against a substantial surface. In a number of instances trauma may be observed along the cranial sutures. Although cranial trauma can produce separation of the cranial sutures there are instances in which suture separation can be the result of post mortem bloating and drying of the head. Differentiation between trauma at the sutures vs post mortem artifactual separation can be quite important in terms of the investigational results. When blunt force trauma is applied to the head along the sutures one will commonly observe separation of the suture as it offers a pathway for dispersal of the blunt force energy. Such suture separation associated with blunt force trauma to the head typically results in breakage of the suture spines into the directly adjacent suture indentations. Decomposition of the head followed by drying can also produce separation at the cranial sutures however the separation is differentiated by the absence of broken and displaced suture spines. A case demonstrating the complexity of suture separation involves the death of a young toddler whose remains had been hidden and encased in multiple layers of materials. Examination of the child who was fairly skeletonized with remnants of mummified soft tissues revealed no significant defects on the outer or inner tables of the skull with the exception of the right temporal/pars lateralis junction which exhibited evidence of suture separation. It was initially thought based on scene evidence that the mother of the deceased had struck the infant on the head thus resulting in his death. However, detail anthropological gross and microscopic examination of the sites of suture separation revealed no evidence of broken or displaced suture spines nor evidenced of discoloration along these areas. Death was attributed to lack of hydration and food.

4.5 Melatonin Detection in Pediatric Deaths

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Melatonin, an endogenous hormone, helps promote sleep. It is available over-the-counter, and can be used to alleviate symptoms associated with insomnia. Recent news reports show that the drug has been administered without appropriate authorization in daycare settings to promote sleep. Toxicology testing can assist in the investigation of these case types by substantiating melatonin exposure.

A quantitative LC-MS/MS analytical method has been developed for the analysis of biological specimens. Melatonin-d₄, sodium carbonate buffer, and MTBE is added to 0.2 mL of sample. Following mixing and centrifugation, the MTBE layer is transferred and evaporated to dryness, and reconstituted with 50% DI water/50% methanol. The ions monitored for melatonin are 233 m/z to 174 m/z and 159 m/z, respectively. The AMR is 1.0 - 200 ng/mL.

To underscore the utility of this method, the following cases are described. In Case 1, a 13-month old male was found non-responsive in a room shared with his brother. A space heater was located between two Pack 'n Plays. Melatonin was found within some of the empty Sippy cups and bottles. The decedent was found unresponsive in the morning. First responders noted the decedent to be extremely warm to the touch. The room temperature was greater than 80°F. ACLS was performed on scene and the decedent was pronounced. A blood sample was submitted for

toxicological analysis. The above method was applied, and the melatonin reported at 210 ng/mL. In Case 2, a 9-month old female was found unresponsive after co-sleeping with an obese adolescent sibling. The caretaker was "partying" the night before; "I was so drunk I do not remember my babies last night". Allegations included exposure to an unspecified pesticide and dextromethorphan, and consumption of half a cigarette. There was admitted use of melatonin. The method detailed above in blood and gastric fluid showed a result of 13 ng/mL and 1200 ng/mL, respectively.

For reference purposes, a single oral 10 mg dose given to 20 men, produced average peak serum concentrations of about 4 ng/mL at 1.3 hrs. post dose. Side effects include drowsiness and sleepiness, and deaths directly and solely due to melatonin ingestion have not been reported. Overall, the analytical method described can be used to verify melatonin exposure and/or use. This is especially relevant in the neonatal and young pediatric populations as these individuals are not capable of providing their own medical history.

4.6 Novel Illicit Opioid Proliferation in Postmortem Investigations: 2017-Q1 2018 Experience

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NMS Labs, Willow Grove, Pennsylvania, USA

Although novel illicit opioids (NIO) account for roughly 2% of the more than 620 new psychoactive substances (NPS) monitored by the European Monitoring Centre for Drug and Drug Addiction (EMCDDA), this category of drugs is being increasingly implicated in postmortem investigations, likely due to increasing toxicity, clandestine distribution, and unregulated product dosing. NIO are appearing on the recreational drug market at an increased rate; 18 fentanyl derivatives were detected between 2012 and 2016 alone. The extent of involvement of NIO in postmortem investigations is likely underestimated, due to the need for sensitive and specific toxicological testing; these substances are also commonly seen with illicit opioids such as heroin and/or fentanyl, which may be sufficient for death investigators.

NIO, along with other categories of NPS, display temporal and geographical trends. For example, furanylfentanyl became available in 2015 and quickly become popular. In February of 2017, furanylfentanyl was reported in 166 cases from a large reference laboratory, accounting for 40% of the NIO cases for that month. Positivity for furanylfentanyl dropped roughly 90% within the year, likely due to a March 2017 Chinese export ban; by February of 2018, furanylfentanyl was only reported in 15 cases, accounting for only 3.6% of NIO cases. Cyclopropylfentanyl was reported for the first time in July 2017; in March of 2018, 78 cases were reported, accounting for 15% of NIO cases. Between 2017 and the first 3 months of 2018, 16 different NIO have been reported, with 12 alone in March 2018. Geographical trends may help provide information to death investigators in regards to the types of substances available in their region. For example, Pennsylvania accounted for 89% of the 97 3-methylfentanyl cases reported in 2017. In 2017 alone, 3852 NOI (excluding acetylfentanyl) were reported in blood in 3039 cases. The emergence of new NIOs and appearance in death investigation casework will likely continue as part of the multi-faceted opioid epidemic facing the United States. NIO are challenging in terms of death investigation due to the breadth of substances that could be used, the requirement for specialized mass spectrometry based toxicological testing, as well as the rapid turnover in availability of substances in response to legislation and market characteristics. Medical examiners should be cautioned to pursue specialized testing for NOI when traditional opioids have been ruled out during opioid overdose investigations; toxicological testing should include the most current substances of the NOI class.

5.1 Consortium of Forensic Science Organizations

Legislative Update

M. Gamette

Consortium of Forensic Science Organizations, Meridian, Idaho, USA

The Consortium of Forensic Science Organizations is the lobbying and advocacy organization for NAME. CFSO will provide a review of the successful efforts over the last year and preview current and future legislative efforts and work with federal government agencies. This year a particular focus will be on CFSO efforts to benefit NAME members such as federal grants, toxicology and death record data collection and sharing efforts, and the federal needs assessment for forensic science service providers. Efforts to work with the CDC and DOJ to address medical examiner and pathology needs will be discussed. Efforts of the CFSO with Congress and federal agencies to address the opioid epidemic will be presented to the membership. The work of the CFSO to end shortages of forensic pathologists, and strategies being pursued will be detailed for the NAME membership. Priorities of the CFSO and the value of CFSO to NAME members will be discussed.

5.2 WITHDRAWN

5.3 Medicolegal Consulting/Private Practice Forensics Workshop

J. Melinek

PathologyExpert Inc., San Francisco, California, USA

This workshop will be composed of two lectures and a panel discussion. The first lecture by Judy Melinek, M.D., CEO of PathologyExpert Inc., will be on the topic of how to get started creating a medicolegal consulting practice. She will cover the steps involved in incorporating your business, marketing it, and establishing contracts and business practices that will protect you from getting "stiffed" by lawyers. She will also briefly cover website design and social media outreach. Kris Sperry, M.D., is the retired Chief Medical Examiner for Georgia, and has been doing private forensic pathology consulting since 1983 (incorporated since 1997). Dr. Sperry will present on the challenges and realities of doing private consulting work while a government employee. This will be followed by a one hour panel discussion of four experienced pathologists who work as independent contractors. Amy C. Gruszecki D.O. is the owner and Medical Director of American Forensics in Dallas/Fort Worth, Texas. American Forensics is the only NAME accredited privately owned forensic consulting company. Gary A. Goldfogel M.D. is a private contractor in Bellingham, Washington State. His professional corporation holds a turnkey professional services contract for complete death investigation services for Whatcom County, serving a population of 300,000. Dan Schultz M.D. is the President of Final Diagnosis Inc, a novel freestanding autopsy facility in Tampa, Florida, offering full service autopsy and medicolegal consulting services. He is also a full time Associate Medical Examiner in the Hillsborough County Medical Examiner's Office in Tampa, Florida. Jonathan L. Arden, M.D. will moderate the discussion. He is President of Arden Forensics, PC, a consultation practice in forensic pathology and medicine, and holds a part-time position as Forensic Pathologist in the West Virginia Office of the Chief Medical Examiner. They will each answer audience questions about their unique business models and what they learned about setting up and maintaining a privately owned business.

6.1 Remediation of Forensic Pathologist Shortages in the United States Through J-1 Visa Exemptions

M. Mendez¹, D. Fowler²

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The Opioid Epidemic beginning in 2014, exacerbated by the proliferation of fentanyl analogues from late 2015 to present, has caused unprecedented numbers of deaths across the United States. Dr. Tom Gilson Chief medical examiner in Cuyahoga County described it in testimony before congress as ". . . a slow moving mass fatality event that occurred last year, is occurring again this year, and will occur again next year." Fewer than 500 board certified forensic pathologists are currently working full-time in the U.S., when the current, up-trending workload requires has been estimated to need between 1,200 to 1,400 fulltime forensic pathologists to meet the NAME autopsy standard necessary for accreditation. Many foreign born pathologists or medical professionals trained either in the United States or overseas, with an interest in forensic pathology are currently ineligible to work in the United States due to the lack of an appropriate work visa program. A visa waiver exemption may represent a viable mechanism to provide short-term alleviation for today's significant shortage of forensic pathologists.

In 2017, Maryland's Office of the Chief Medical Examiner successfully collaborated with the Maryland Department of Health to obtain J-1 Visa exemptions for forensic pathologists. This presentation will include a review of requirements and processes for obtaining the J-1 Visa exemption, including domestic FTE availability, the application process, eligibility requirements, potential extensions of the visa exemption, and use of the J-1 Visa exemption as a potential path for citizenship, and a long term professional career path for foreign born forensic pathologists in the United States.

The presentation will also review the federal and state laws governing J-1 Visa exemptions, the allowable length of residency with J-1 visas, and navigation of the potential roadblocks to permanent workforce eligibility caused by the J-1 visas requirement of two-year return to home country, through allowable waivers. Such waivers allows physicians to remain in the United States to practice in a federally designated Health-Professional-Shortage Area (HPSA) or Medically-Underserved-Area (MUA) if recommended by a qualifying federal agency, including HHS, VA, HUD, Interior, Global Affairs, and the National Science Foundation. The presentation will include a description of allowed state sponsorship of J-1 visa physician exemptions under the Conrad State 30 Program, as well as the Flex 10 geographic exception, and will provide an overview of the potential for the extension of these state programs specifically to forensic pathologists.

6.2 Federal Interagency Working Group on Medicolegal Death Investigation

M. Warner¹, J.G. McGrath², P. Braun¹

¹*CDC/National Center for Health Statistics, Hyattsville, Maryland, USA;*

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A Department of Justice Office of Justice Programs (OJP) and Department of Health and Human Services (HHS) Medicolegal Death Investigations (MDI) Federal Interagency working group (IWG) was convened in early 2018 to coordinate Federal activities to strengthen the MDI system. The MDI IWG will identify both short and long term goals to develop and implement Federal programmatic activities that support the MDI system, that in turn, support public safety and public health national initiatives and strategies. This presentation will discuss the MDI-IWG current activities and future plans. This MDI-IWG includes representatives from about twenty Federal agencies and builds on previous activities including the 2015 Office of Science and Technology Policy/National Science and Technology Council (OSTP/NSTC) Fast-Track Action Committee working group, which recommended strategic policy measures that could be implemented to improve the quality, uniformity, and availability of MDI data and to maximize the utility of the data for Federal purposes, and resulted in the report: Strengthening the Medicolegal Death

Investigation System: Improving Data Systems (September 2016). A subsequent OSTP/NSTC MDI working group was formed in Spring 2016 by OSTP/NSTC in coordination with DOJ and HHS to enable broad interagency consideration of MDI recommendations regarding accreditation of medical examiner/coroner (ME/C) offices and certification of MDI personnel, and to consider additional ways to strengthen the MDI system based on exchange of information and discussion of MDI-related science and technology needs among the agencies, and published the report: Strengthening the Medicolegal-Death-Investigation System: Accreditation and Certification a Path Forward (December 2016). The current OJP/HHS MDI IWG is reviewing previous recommendations, and will focus on three main areas, (1) strengthening communications between nation's ME/C offices, HHS, DOJ, and other federal agencies with interest in MDI; (2) data and technology systems including strengthening and promoting interoperability among current electronic systems used within the MDI community, including electronic death registration systems, and considering data needs to facilitate timely data sharing and statistical reporting; and (3) workforce issues, including addressing the shortage of forensic pathologists, as well as certification of personnel. Although not specifically focused only on the drug overdose crisis, the MDI IWG will consider the needs related to drug overdoses and the opioid crisis.

6.3 Navigating the J1 Visa Process: A Canadian's Perspective

A. Rajkumar

Dane County Medical Examiner's Office, McFarland, Wisconsin, USA

Qualified, foreign born International Medical Graduates (IMG's) who are seeking employment in the United States face many immigration difficulties acquiring a job in forensic pathology. There are three common work visa/status options that are available to foreign born medical graduates who attain a residency position in the United States: J1 exchange visitor visa, H1b visa and green card.

The above listed options can be entered into as separate entities, or can be a lengthy and progressive pathway. If one were to rank these with the perspective of efficiency of career progression, the green card would be first choice, the H1b the second and the J1 exchange visitor visa would be ranked last.

The J1 visa sponsorship is administered by the U.S. Department of State. This program allows persons from another vetted country to train in the USA for a maximum of 7 years with a 2 year home residency requirement (also known as return of service) before attempting to return to the United States. There are five statutory bases for a waiver of this 2 year home residency requirement: No objection statement, Fear of prosecution, Exceptional Hardship, Request by State Health Department, and Request by an Interested U.S. Federal Government Agency. Obtaining a waiver involves 3 years of service to the sponsoring entity.

The J1 visa is widely accepted by many residency and fellowship programs as the annual financial responsibility falls to the resident and acquisition of a J1 visa is managed by the Education Commission of Foreign Medical Graduates. Canada, currently is the only country that limits the availability of J1 sponsorship through one requirement known as a "statement of need".

The purpose of this presentation is to help the community of forensic pathologists understand the value of an investment into qualified, international foreign graduates. This investment can be mutually beneficial to both the employee and forensic offices across the United States and can alleviate the significant backlog that is afflicting many offices due to the opioid crisis.

6.4 Update on Continuous Certification and Impact on Forensic Pathologists

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The American Board of Pathology (ABP) began issuing time-limited certificates in 2006, reflecting the concept that the certification process is ongoing and requires periodic reassessment. Diplomates since that year participated in the ABP program of Maintenance of Certification (MOC) in order to maintain board certification; the program was re-branded as Continuous Certification (CC) in early 2018. At the same time, development of a new assessment tool called CertLink was announced, consisting of a series of quarterly online open-book, timed quizzes with immediate feedback. The American Board of Pathology maintains that the changes to MOC/CC have been made in response to diplomates' concerns and/or complaints about MOC, particularly the high-stakes maintenance of certification exam. CertLink is intended to replace the single high-stakes exam at the end of the 10-year cycle with a continuous (quarterly) assessment spread over the 10-year period. While 8,061 diplomates of the ABP are required to participate in CC currently, only 462 (5.7%) of those diplomates hold a Forensic Pathology certificate. Forensic pathologists practice in a unique environment that is significantly different from other general or subspecialist pathologists. This presentation will serve to discuss CC from a forensic pathologists' perspective, to provide insight into the ABP's process and rationale for changes as well as future plans, and to share perspectives from forensic pathologists who have served recently on the ABP's MOC Advisory Board and CertLink beta testing pool.

6.5 2018 Medicolegal Death Investigation Salary Survey

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Regional Forensic Center, Knoxville, Tennessee, USA

A survey of professional involved in medicolegal death investigation was deployed in early 2018 with the intent of elucidating salaries, work hours, and working conditions. Participants were recruited from the National Association of Medical Examiners, and through postings to NAME-L, the NAME mailinglist. 238 participants provided complete results consisting of 192 pathologists, 25 medicolegal death investigators (MDIs), 10 autopsy assistants (AAs), and 6 lay Coroners, with the remaining being other (e.g. forensic anthropologists, odontologist, etc). Mean base (full-time employment) income for forensic pathologists was \$223,445, for MDIs \$62,458, for AAs, and \$72,460 for Coroners. Mean total income from all sources was \$256,664 for pathologists and \$139,500 for Coroners. Cohort analysis for MDI, AA, and Coroners was limited due to low response rates. Full results have been provided on the NAME-L mailinglist, This presentation will include an overview of the results regarding base income, total income, hours, number of autopsies, workplace satisfaction, and multivariate analysis of relative importance/dominance analysis of demographic and workplace factors and their prediction of income and workplace satisfaction. There are significant limitations of the study including issues of representation and completeness that will be addressed.

6.6 Hosting International Forensic Pathology Scholars

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International exchange programs offer many opportunities for both visiting scholars and host organizations. In addition to ideas, skills and technologies, both sides benefit from the cultural exchange and often form long-term friendships and professional relationships. International exchange may be valuable for forensic pathologists, considering the challenges of emerging diseases spread by world travel, mass fatality disasters occurring almost anywhere on the globe, international terrorism, and unexpected deaths of foreign nationals. Toward that goal, many medical examiner offices in the US have advertised international exchange opportunities through the NAME website. This presentation describes experiences of various medical examiner offices who have hosted foreign guests and offers recommendations for offices wishing to participate in an international education program.

International candidates for available positions are highly qualified individuals who are extremely motivated. For example, trainees from Sri Lanka have completed five years of medical school, which include one year of lectures and practical experience in forensic medicine, followed by a one year internship in general medicine and a minimum of 5 years of in-country training in both forensic pathology and clinical forensic medicine. They are typically well over 30 years of age and have performed over one thousand autopsies and many more clinical forensic examinations. To become fully credentialed, Sri Lankan forensic pathologists are required to have one year of overseas training. The Sri Lankan government provides a stipend to the trainee while living in the foreign country. For host medical examiner offices without university support, resources are available from an independent agency experienced in securing J-1 visas for foreign trainees. There is no expense for the host medical examiner office. As the trainees come experienced, they are quite capable of assisting with autopsy examinations and are eager to participate in research projects. From the experiences described in this presentation, members of NAME will feel confident that the returns of hosting a foreign trainee in forensic pathology are well worth the effort and there are sufficient resources available to make the venture successful.

6.7 Are Truncated Autopsy Reports a Useful Tool in Managing Case Turnaround Times? The Use of the "Summary of Autopsy Findings" in a Large Medical Examiner System

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Background: A criticism facing the Massachusetts' Office of the Chief Medical Examiner (OCME) is length of time it takes to complete cases (i.e. turnaround time, or TAT). This is a multifactorial problem, but majorly attributed to workload. While conventional wisdom equates inadequate physician staffing to delays in case completion, little attention is paid to efficiency of the work product itself, namely death certificates and autopsy reports. The OCME has developed a new reporting tool, known as the Summary of Autopsy Findings (SAF) as an optional medical examiner work product to the standard autopsy report, for cases that have relatively straightforward anatomical findings at postmortem examination. This truncated report highlights the autopsy findings in a summary list, and eliminates the tedium of exhaustive written documentation of incidental external findings (for instance scars and tattoos) that are diagrammed, photographed, and retained elsewhere in the electronic and paper case file. This present study attempts to validate the use of SAFs by medical examiners at the OCME, and in particular asks 1) does the SAF improve overall case TAT, and 2) is the TAT of autopsy work products an important consideration for the satisfaction of the general public. Design: This case-control study matched autopsies generating SAFs (n=126) with those that produced full autopsy reports (n=126), and compared the length of time to completion of the death certificates and

reports associated with each case. All matched autopsies were performed between 11/11/17 and 2/23/18, and within an average of 1.4 days apart. Additionally, a survey of 44 students unfamiliar with mortuary practices explored satisfaction with autopsy work product TAT.

Results: SAF reporting significantly ($p < 0.0001$) improved autopsy work product TAT with median completion length for SAFs of 4 days, and finalized death certificates in 56.5 days. In contrast, cases generating a full autopsy report had reports completed in a median of 72.1 days, and finalized death certificates in 69 days. Survey results showed strong favoritism toward quick autopsy results with 48.9% ($n=22$) students satisfied with results within one day of the autopsy, and 43.1% ($n=19$) wanting results within one week. Likewise, 18.2% ($n=8$) and 41% ($n=18$) would be upset if they had to wait more than a week and a month respectively for autopsy results.

Conclusion: The SAF is a useful management tool to consider for improvement of mortuary turnaround times and to satisfy the public's desire for rapid communication of autopsy information.

6.8 After SIDS, SUID, or Undetermined: A Diagnostic Service for Parents and Medical Examiners Wanting to Know More

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Nearly 10% of US child mortality from ages 0-19 years remains without an established cause (R95-99 for 0-19 years and W75 < 1 year). Two-thirds of those deaths occur in infants who are certified to have died from the Sudden Infant Death Syndrome (SIDS) or Undetermined Cause. Many parents whose children died unexplained natural deaths seek a deeper explanation when their deceased child's mandated investigation is completed. Robert's Program in Sudden Unexpected Death in Pediatrics (SUDP) at Boston Children's Hospital works in partnership with parents and medical examiners to pursue an investigation not readily available in most jurisdictions, providing specialized neuropathological, cardiac, and genetics assessments conducted by a team specialized in the examination of sudden unexpected death in pediatrics. The assessment incorporates in-depth historical review including three-generation family pedigree, review of specific neuropathological sections and cardiac autopsy, and whole exome analysis of the parent-child triad. In addition, Robert's Program has developed a SUDP gene panel for genetic risk screening in trio or proband-only exome analysis. This session will provide an overview of the rationale and general diagnostic approach of Robert's Program, and present instructive case findings. Case presentations include a novel presentation of glutaric acidemia involving SIDS and a living sibling, temporal lobe sclerosis in a toddler dying of Sudden Unexplained Death in Childhood (SUDC) and a living sibling, hippocampal malformations and two associated genes, and cardiac genes with variable penetrance.

The objectives of this presentation are to:

- Describe new developments in the explanation of sudden unexpected death in pediatrics
- Define the undiagnosed diseases diagnostic approach of Robert's Program for sudden, unexplained natural deaths in children and infants under age three years after unrevealing forensic autopsy
- Discuss case illustrations demonstrating undiagnosed genetic, neurologic, cardiac and metabolic diseases

7.1 Cardiovascular Devices--What's New Under the Skin?

E.R. Ladich

Pathology Consultants of South Broward, Memorial Regional Hospital, Hollywood, Florida, USA

The last several decades have witnessed an explosion in the various types of cardiac devices and interventional procedures available to treat cardiovascular diseases. Medical examiners and hospital pathologists will continue to encounter a growing number of these devices in daily practice and should have a basic understanding of the types of devices, potential complications, and the morphological features unique to each device.

Documentation of specific pathologic features including structural deterioration, calcification, thrombus, and infection should be performed at explant and autopsy. In addition, autopsy should include evaluation of major organs such as brain, kidneys, and lungs to evaluate for emboli or other sequelae related to the device and/or procedure. The anatomy and pathology of the underlying tissues and diseases are also important to document. Most importantly, when the clinical outcome was poor or unexpected, the pathologist should offer insights into the mechanism of treatment failure as it relates to the procedure/device, the patient's underlying disease, and correlate with clinical studies including imaging when possible. The major categories of devices presented will include coronary stents, surgical and percutaneous valves, grafts including stent grafts, and ventricular assist devices.

7.2 Cardiomyopathies: A Practical Approach to the Evaluation in the Setting of Sudden Cardiac Death

S.J. Radio

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Cardiomyopathies (CDM) are an important cause of congestive heart failure and sudden cardiac death. Evaluation of the gross and microscopic morphology is essential to classifying such diseases accurately with important diagnostic, etiologic and familial counseling implications. Utilizing a case based format, examples of the common presenting forms of dilated, hypertrophic and restrictive CDM will be discussed along with essential endocardial based diseases. In addition, important mimickers and variant forms will round out the discussion. Emphasis will be placed on a practical approach to the diagnosis with succinct explanatory notes on pathogenesis as deemed appropriate.

7.3 The Mechanism and Investigation of Traumatic Basal Subarachnoid Hemorrhage and Vertebral Artery Injury

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The pathologist faced with a potential death from traumatic basal subarachnoid haemorrhage (TBSAH) has a number of problems to address and steps to perform, in order to subsequently take such a case effectively through criminal proceedings. These include confirming the traumatic nature of the death, identification of the site of vascular bleeding, removal of the vessels and histological assessment - not only to confirm the nature of the vascular breach but also the underlying condition of the arterial wall. This is not easy to achieve given the anatomical course of the vertebral arteries through the bony foramina of the cervical spine and around the base of skull, particularly with the common finding of the cerebellum and brainstem encased in blood. A consideration of other potential predisposing factors making the victim vulnerable to an upper neck insult and the identification of the likely fatal blow (and who delivered it) are also important; the latter particularly so if more than one assailant is involved. The workshop intends to provide a practical approach to dealing with TBSAH and vertebral artery injuries and will cover: proposed mechanisms of vascular wall injury, angiography and fluid injection, the postmortem approach to the posterior fossa, in situ removal of the extracranial and intracranial course of the vertebral arteries, histological sampling and microscopic assessment. The importance of reviewing CCTV footage in highlighting the violent nature of these incidents and the

nature of collapse will also be illustrated. The differing features and problems associated with vertebral artery dissection will also be presented along with the potential value of including a genetic work up as part of the post mortem investigation. The session could conclude with the opportunity for attendees to present relevant short cases and /or a panel discussion (liaison with the scientific organisers obviously essential) and would work best to a smaller audience than the main auditorium.

8.1 Pathologic Correlation with Autopsy-Defined Sudden Arrhythmic Death in the San Francisco Postmortem Systematic Investigation of Sudden Cardiac Death (POST SCD) Study

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Introduction

Prior pathologic studies evaluating the underlying causes of sudden cardiac death (SCD) are outdated and limited by referral bias of only small subsets of SCDs, and few studies have defined the prevalence of cardiac disease in the general population. We compared comprehensive autopsy findings from a matched sample of trauma deaths (TD) to autopsy-defined sudden arrhythmic deaths (SAD) in San Francisco County to determine pathologic correlations with SAD.

Methods

Between 2/1/2011 and 3/1/2014, we identified all incident WHO SCDs, ages 18-90, for detailed autopsy, toxicology, and histology via active surveillance of consecutive out of hospital deaths, which must be reported to the ME by law. A multidisciplinary committee adjudicated cause of death (COD). SADs had no extra-cardiac COD (eg, tamponade, PE, hemorrhage, intracranial bleed, occult overdose) or acute heart failure. Detailed autopsy was also performed in a random sample of demographically matched TD to estimate population disease prevalence. Pairwise comparisons of SAD, non-SAD, and TD were made with logistic regression, adjusted for age, sex, and race.

Results

We identified 541 SCDs in SF over 37 months (mean 62.8 y, 69% male, 53% white); 525 (97%) were autopsied and 294 (56%) were SADs. 104 of 572 matched contemporaneous TDs were autopsied (mean 55.1 y, 74% male, 48% white). Cardiac mass index (CMI, gm²/kg) was highest in SAD (18.0 ± 4.6) vs. non-SAD (17.1 ± 4.6) and TDs (14.7 ± 4.3, p = .001). Adjusted OR (aOR) for SAD vs TD was 1.8 (95% CI 1.4-2.3, p < .0001) for each 1 cm increase in LV short axis diameter and 2.2 (95% CI 1.4-3.6 p = .0014) for LVH (any LV wall compact myocardium > 1.5 cm). Mitral valve prolapse was found in 2 SADs, 1 non-SAD, and no TDs (p = 1.0); moderate or severe aortic stenosis was not associated with SAD (p = 0.5). Coronary artery disease (CAD, ≥ 50% stenosis in ≥ 1 vessel) was associated with SAD (aOR 5.5, 95% CI 2.5-11.9, p < .0001) with increased risk with each additional diseased vessel. RCA stenosis had highest risk of SAD (aOR 5.4, 95% CI 2.1-13.9, p = .0005).

Conclusion

Comparing findings from nearly every autopsy-defined SAD in an entire diverse metropolitan area to matched TDs, CMI and short axis LV diameter were higher. LVH, CAD, and RCA disease in particular, were associated with SAD.

8.2 DNA Extraction from Diverse Post-Mortem Samples

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¹Northwestern University, Chicago, Illinois, USA; ²Cook County Medical Examiner, Chicago, Illinois, USA **Background:** Cardiac events are major

causes of sudden death in persons aged 1 to 40 years. Genetic etiologies are found in 30% of cases, and genetic analysis may assist in risk stratification for surviving family members. NAME guidelines (2013) recommend saving post-mortem blood in containers with EDTA. However, these guidelines have not been uniformly implemented. The objective of our study was to document the practical efficacy of DNA extraction from diverse post-mortem samples.

Methods: A national network was established in partnership with medical examiner (ME) and coroner offices in 16 states. Blood storage in EDTA was recommended, but cases were accepted in any container. DNA was extracted using isopropanol precipitation (Qiagen PureGene) after RNase treatment (Sigma Aldrich) and protein precipitation (Qiagen). DNA was quantified using spectrophotometric analysis (NanoDrop). Whole genome sequencing (WGS) was performed on an Illumina X-Ten system.

Results: Samples from 103 cases arrived a mean of 135 days after autopsy (median 80; range 1-1007). Sample tubes were lavender top/EDTA in 65 cases (63%), grey top/sodium fluoride and potassium oxalate in 16 cases (16%), screw-top container/sodium fluoride in 6 cases (6%), red top/no additive in 3 cases (3%), tiger top/silica particles in 1 case (1%), and non-standard containers in 12 cases (12%). DNA extraction yielded a mean of 596.8 micrograms (mg) of DNA (median 375.2, range 0.9-3668). There was no difference in DNA quantity extracted from EDTA tubes versus other tube types (615 vs. 565 mg, p=0.72). Using a threshold of 2 mg as required for WGS, yield was sufficient in 101/103 cases (98%). Of those that failed, 1 sample was shipped in a lavender top and 1 in a grey top tube. DNA yield per volume of blood could not be quantified reliably in this study. WGS was performed in 68/135 cases (50%), and all passed data equivalents for >30X coverage. DNA extraction from liver samples was attempted in 9 cases, but none yielded sufficient high-quality DNA. DNA was successfully extracted from an alternate blood tube type in all 9 cases where liver extraction was attempted.

Discussion: In a national network studying sudden death in the young, appropriate quantity and quality of DNA required for WGS was extracted successfully from post-mortem blood in 98% of cases regardless of tube type. In our experience, DNA extraction from liver was not an effective strategy.

8.3 Post-mortem Genetic and Polygenic Profiling to Inform Risk to Living Relatives

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Cardiovascular disease is the leading cause of death in the United States. Approximately 11,000 individuals in the United States, under the age of 45 years, die from a sudden cardiac related death. These individuals can and should be profiled for genetic causes of death to inform risk to living family members. In addition, 300,000 - 400,000 deaths per year are due to sudden cardiac death across all age groups. The most common underlying etiology is coronary heart disease, though other cardiac conditions such as arrhythmia and stroke contribute significantly. Previously, we demonstrated that testing for individual gene mutations (monogenic risk) can identify the cause of death in a significant proportion of early deaths. In addition, late-onset cardiac conditions are also mediated by genetic factors - however these genetic factors are numerous and contribute to disease cumulatively across individual genetic variants. This cumulative genetic risk can be quantified into a single score - termed a polygenic risk score. Polygenic risk profiling has been recently demonstrated to identify individuals at significant risk for cardiovascular disease, specifically coronary artery disease, and identify individuals at elevated risk who receive greater benefit from prophylactic therapy such as statin intervention. Similar polygenic risk scores have been demonstrated

to be useful for the identification of individuals at risk for other potential fatal cardiac conditions such as atrial fibrillation. We propose that polygenic risk profiling in relatively young (<60 years) individuals, especially with a lack of clinical risk factors, can identify individuals whose disease and eventual death may have been mediated significantly by polygenic risk factors. Identification of these individuals may significantly enhance the power to detect new polygenic risk factors, and inform genetic risk of living family members. The goal of this presentation is to present the concept of polygenic risk profiling, review its utility in living individuals, and propose that, in addition to monogenic risk profiling, polygenic risk profiling in the deceased may inform prioritization of healthy behaviors in living relatives.

8.4 The Vital Role of Medical Examiners and Autopsy Data in Trauma System Development

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A 2016 report endorsed by the ACS CoT definitively outlined the need to create a comprehensive trauma system with the goal to eliminate preventable death and disability.

The true number of potentially preventable deaths in the US is not well established. Injury data is not consistently integrated for those injured patients who survive to entry into the trauma system. There is minimal linkage across elements of pre-hospital, acute care, and rehabilitation. Since the majority of injury mortality occurs before acute care, this shortcoming represents a tremendous blind spot due to lack of ME data.

HHS and Sec Def have been instructed to ensure that military and civilian trauma systems collect and share data spanning the entire continuum of care.

This goal will require complete investigations of all decedents and collaboration with trauma systems. Since 2001, the AFMES has conducted complete investigations on all cases and conducts mortality conferences to identify improvements that can be made in casualty care and determine the potential survivability of the injuries sustained. This can serve as a model for similar interactions between civilian medicolegal authorities and their local trauma systems.

Local trauma systems use strict guidelines for describing injuries - set forth by the AAAM AIS scoring system and then converted to Injury Severity Scores (ISS). Evaluation of the medical record and the autopsy report is done by Trauma Registrars. In an ACS verified trauma center, the registrars have attended formal courses in Injury Scoring.

According to the AAAM, "autopsy or medical examiner reports will be more detailed and complete than ED records". Registrars rely on the most reliable source. TQIP and NTDB are silent regarding the inclusion of autopsy information in the trauma registry. The decision not to put this information in the registry may lead to low ISS in patients who receive minimal hospital care.

A patient with any ISS can die. ISS may not be complete without an autopsy report. Examples of ISS scores with and without autopsy results will be presented.

The NAME Past Presidents Committee surveyed the membership on the level of their cooperation with trauma systems. When the Trauma Center specifically asks for autopsy reports, most of the ME offices share these reports; a few ME Offices have more actively submitted the autopsy reports. Only a few offices indicated any collaborative research. Three

offices responding have existing collaboration programs. These will be described.

8.5 National Institute of Justice's (NIJ) Support for the Medical Examiner/Coroner Community

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The National Institute of Justice (NIJ) is the research, development and evaluation agency of the US Department of Justice. NIJ is dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to inform the decision-making of the criminal justice community to reduce crime and advance justice, particularly at the state and local levels. NIJ's Forensic Science Research and Development Program fulfills this mission through supporting research that will increase the body of knowledge to guide and inform forensic science policy and practice, or result in the production of useful materials, devices, systems, or methods that have the potential for forensic application. NIJ's direct-service programs assist crime laboratories and medical examiner/coroner offices by increasing capacity and reducing backlogs through streamlining processes, hiring personnel, and purchasing technology and supplies. This presentation will discuss programs issued by the NIJ that support the medical examiner/coroner community through both research and direct service assistance, including: Research and Development in Forensic Science for Criminal Justice Purposes Program, Paul Coverdell Forensic Science Improvement Grants Program, and the Strengthening the Medical Examiner-Coroner System Program. The NIJ Program Managers for these programs will discuss the specifics of each program, to include the purpose and goals of each, and funding opportunities under these programs available to medical examiner/coroner agencies. This presentation will provide an opportunity for the community to learn more about NIJ's efforts to support the medical examiner/coroner system.

9.1 Enhancing Opioid Overdose Surveillance in States

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In 2016, there were 63,632 drug overdose deaths in the United States, and opioids were involved in 66.4% (42,249) of those deaths. Age-adjusted death rates for overdose deaths involving synthetic opioids other than methadone doubled from 2015 to 2016, likely driven by increases in deaths involving illicitly-manufactured fentanyl. Rates for deaths involving prescription opioids, heroin, cocaine, and psychostimulants also increased. The sharp increases in drug overdose deaths in recent years, coupled with the introduction of new synthetic opioids into the illicit opioid market, has made it more costly and difficult for medical examiner and coroner (ME/C) offices to conduct comprehensive post-mortem toxicological testing. In order to provide more timely surveillance data, the Centers for Disease Control and Prevention (CDC) began funding enhanced surveillance efforts in 2016 to provide additional information on nonfatal overdoses as well as circumstances and substances involved in opioid overdose deaths.

This presentation will describe the CDC-funded Enhanced State Opioid Overdose Surveillance (ESOOS) program, with particular emphasis on the component of the program that provides information on unintentional and undetermined intent fatal opioid overdoses, the State Unintentional Drug Overdose Reporting System (SUDORS). ESOOS currently funds 32 states and the District of Columbia. The goals of ESOOS are to: 1) increase the timeliness of reporting of nonfatal opioid overdose and to detect sharp increases or decreases; 2) increase timeliness of reporting of fatal opioid overdoses and associated risk factors; and 3) disseminate surveillance findings to key stakeholders working to prevent or respond to

the opioid overdose epidemic. In addition, CDC awarded supplemental funding to states participating in SUDORS requiring direct support to medical examiners and coroners (at least 60% of supplement funds) to enhance their ability to conduct comprehensive toxicological testing of opioid overdose deaths. Through ESOOS, CDC reports data on nonfatal drug overdoses, opioid overdoses, and heroin overdoses by states on a quarterly basis as well as data on fatal overdoses by specific drug(s) because of enhanced toxicology reporting twice a year. The increased timeliness of these data will inform the strategic planning around CDC-funded prevention efforts, facilitate a more rapid, targeted response effort at the local level, and disseminate data to key stakeholders and policymakers.

9.2 Fatal Mitragynine-Associated Toxicity in Canada: A Case Report and Review of the Literature.

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Mitragynine is amongst the more than forty natural indole alkaloids derived from the *Mitragyna speciosa* or kratom tree. It is unique in that it exhibits dose dependent pharmacological actions with stimulant effects at lower doses but sedative effects at higher concentrations. It is indigenous to South East Asia, where the local population has had extensive experiences utilizing the substance for its medicinal as well as recreational effects. Mitragynine is advertised as a herbal remedy and is easily accessible via the Internet. The addictive potential of this substance is well recognized and it has been implicated in multidrug deaths.

The case of a 56 year old woman with COPD who was found dead in bed after she had not sought medical attention for recent complaints of dyspnea and cough is presented. Her medications consisted of acetaminophen, oxycodone, lorazepam and cannabidiol oil drops. Scene investigation indicated that the number of pills remaining in each prescription bottle was noticeably less than if they had been taken as prescribed. Relatives reported that she would use a 'methadone-like' powder which was obtained from Indonesia.

Post mortem examination revealed a slightly overweight middle aged woman with a white residue on her lips, cardiomegaly (532 g) with biventricular hypertrophy and mild atheromatous disease of the coronary arteries. Luminal pus was present within the tracheobronchial tree and both lungs (left 696 g; right 658 g) were hyperinflated with prominent fibrosis, consistent with COPD. No features of bronchopneumonia were grossly evident. The liver exhibited passive venous congestion. The kidneys were scarred. The urinary bladder contained 14 mL of urine. Routine histology and toxicology (cardiac blood, femoral venous blood and urine) were undertaken.

Histological examination of the lungs revealed bilateral bronchopneumonia on a background of COPD changes. Group B *Streptococcus* and *Staphylococcus aureus* were isolated on culture of the pus in the trachea.

Toxicological analysis of the femoral venous blood detected oxycodone (0.19 ± 0.01 mg/L), lorazepam (63 ± 5 ng/L) and mitragynine (2500 ng/mL) to account for death in combination.

This is the first reported mitragynine-associated fatality in Canada with a potentially independently fatal mitragynine concentration which is the highest reported concentration to date (20-600 ng/mL). The source drug was likely the powder obtained from Indonesia via the internet. This case report is presented to draw attention to the ease of accessibility of this dangerous substance via the internet in an attempt to prevent further deaths.

9.3 Findings from DEA's National Forensic Laboratory Information System (NFLIS) Medical Examiner and Coroner Office Survey

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The National Forensic Laboratory Information System (NFLIS) is an important Drug Enforcement Administration (DEA) resource in monitoring illicit drug abuse and trafficking. Available NFLIS data reflect the results from drug chemistry analyses conducted by Federal, State, and local crime laboratories across the United States (NFLIS-Drug). The DEA is enhancing its efforts to combat diversion and identify new and emerging drugs of misuse and abuse by expanding NFLIS to include death data from medical examiner and coroner offices (NFLIS-MEC) and drug testing-related data from toxicology laboratories nationwide (NFLIS-Tox). In preparation for this expansion, DEA conducted a 2017 NFLIS MEC Survey and a Toxicology Laboratory Survey.

The MEC Survey was designed by NFLIS staff with the help of external consultants. The survey collected data from calendar year 2016 using a mixed mode data collection over a four-month period. To increase survey responses, NFLIS staff performed verification calls to confirm MEC contact information and point of contact, prompting call reminders, and nonresponse calling to collect two critical questions.

Of the 2,145 MECs that were sent a survey, 45% of offices provided complete surveys. Upon data collection completion, the response rate increased to 60% based on nonresponse follow up calls to obtain critical items. MECs that provided information on the total population of the jurisdictions their offices served, 39% served small jurisdictions (population < 25,000), 44% served medium jurisdictions (population 25,000 to 249,999), and 18% served large jurisdictions (population > 250,000). MECs were asked if their offices used an off-site toxicology laboratory. Nearly all (96%) MECs indicated they used an off-site toxicology laboratory. Overall, 785,923 human death cases were referred to and 497,395 human death cases were accepted by MECs responding to the survey. Case completion was defined as completion of a death certificate. Average turnaround time to complete a case was 31 days. MECs that provided information related to which types of accreditation their offices currently held, nearly three-quarters reported no accreditation. The most commonly reported accreditations were a State accreditation (12%), accreditation by the NAME (9%), and accreditation by the IAC&ME (6%). MECs that answered the question on computerized or manual information systems, nearly equal percentages of MECs reported having a computerized, networked system (32%), using a manual record-keeping system (31%), or using a partially computerized system with some manual record-keeping (30%).

10.1 Management of Mass Fatality Incidents

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A mass fatality incident (MFI) is one in which the number of decedents exceeds and/or overwhelms the local resources. Since September 11, 2001 many local, state and federal jurisdictions have spent large amounts of time and resources planning for mass fatality events, focusing on terroristic threats and massive natural disasters. While these are important to prepare for, the current picture of an MFI includes domestic large-scale public shootings. Management of an MFI has always been a challenge – in part because no two MFI's are alike and the resources available vary considerably by jurisdiction. Media coverage of these incidents has also increased, placing medical examiners and coroners at

the forefront of news briefings and headlines. The manner in which the details are communicated to the families of the victims, as well as the public, has become as important as how the decedents are handled. One of the biggest differences in the types of MFIs is whether the population involved is closed or open. A closed population is one in which the list of potential victims involved is known, either through a manifest or record of participants/students/employees. Open populations have no available list of known individuals involved, making it much harder to manage. For incidents involving an open population, an effective means for reporting missing persons must be established, in addition to the decedent processing and identification.

This presentation will discuss the management of several different types of MFIs, including commercial aviation crashes, college and nightclub shootings, floods and earthquakes and a unique non-disaster related incident involving the post-funeral disposition of decedent remains. A multi-person panel will share experiences from these incidents, including the biggest challenges faced and any lessons learned, to continue to improve how MFIs are handled.

11.1 Sudden Death from Head Trauma in Video-recorded Pediatric Short Fall: Subdural Hematoma, Retinal Hemorrhages, and Traumatic Brain Injury

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This is a case report of a toddler who died following a video-taped short fall. The child ran out onto a bowling alley, slipped and fell, hitting the back of her head. The autopsy examination documents skull fractures, subdural hematoma, retinal hemorrhages and traumatic brain injury. This case report challenges the conventional wisdom that head injuries from short falls do not result in death. This case further illustrates that the so-called "triad" of subdural hematoma, retinal hemorrhages, and traumatic brain injury are not exclusively diagnostic of inflicted head injury.

11.2 Classification of Pediatric Suicides

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Review of data from the CDC for pediatric suicides between 2000 and 2010 shows a relatively stable number of annual deaths, with an average of approximately 1380/year. A steady annual increase in pediatric suicides is seen thereafter, reaching 2,023 deaths in 2016, representing 2.6 deaths per 100,000 of this age group. The suicide rate is even more staggering in the white male population, reaching 1,199 deaths, or 4 deaths per 100,000 in 2016. As is often seen in death classification studies, one of the major limitations when compiling statistics is a lack of uniformity in the determination of the cause and manner of death. For this purpose, a survey regarding the classification of pediatric suicides was prepared and sent to all forensic pathologists practicing in the State of New Jersey and to members of the Child Fatality and Near Fatality Review Board (CFNFRB), including members who sit on the Suicide subcommittee of this Board. A total of 34 responses were received and reviewed. Analysis of the survey responses showed that 19 respondents (55.9%) believed that there should be a minimum age below which such cases should not be ruled as suicides, with 50% using the 10-12 year age group as a cut-off. Respondents were asked to rate the importance of specific risk factors for suicide, such as a history of depression, bullying etc., as well as the utility of different investigative information, such as family interviews and review of social media postings. Another question asked respondents to indicate whether an autopsy and toxicology studies were considered necessary in these cases, with affirmative responses received

in 87.9% and 97.1% respectively. Using the State-mandated database (Case Management System), cases of decedents under the age of 18 years with a manner of death of suicide, as well as those classified as accident or undetermined (deemed by reviewer to result from self-inflicted injury) during a 4-year period between 2014 and 2017 were identified. The investigative and autopsy reports of these cases were reviewed, and this information compared to the survey findings to assess the extent to which each case was worked-up. This study highlights the need for a uniform approach to classifying suspected pediatric suicides. This would allow for a more reliable identification of these cases, a better assessment of the extent within the population, and the identification of any emerging trends, that in turn will direct public health-related efforts aimed at prevention.

11.3 Critical Value Reporting: The Need To Develop Appropriate Communication Channels

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Background: Critical values are defined as any examination result originating from a coronial postmortem examination (PME) that "prompts expeditious testing/monitoring of a decedent's relatives" and must be communicated quickly to next of kin (NOK). There should be a clearly defined mechanism to notify (NOK) and their family doctor (FD) who will guide them as they seek medical advice on options for diagnosis or treatment. However, Forensic Pathologists in New Brunswick (NB) Canada are not permitted under provincial law to make such disclosures to relatives or to the FD. This can delay communication of critical values. Discussion: In NB, disclosure of personal information including critical values is governed by the Right to Information and Protection of Privacy Act (RTIPPA). Under the act, "personal information about individuals held by public institutions is well protected and handled only in accordance with generally accepted privacy principles". The NB coroner's office is part of the Department of Public Safety, and subject to RTIPPA. This creates important limitations:

- The FD is not required to be notified when a patient registered in their practice dies nor do they need to be advised of the cause or manner of death. FD's requesting PME reports find out only when they call to ask for a report. The NOK alone can authorize the coroner to distribute copies of the postmortem report to the FD.
- Since forensic pathologist must transmit critical values through an intermediary (the coroner), the PME report must be succinct and emphasize the importance to the family of following up with their FD. A documented phone call to the coroner is ideal and should be part of any critical value reporting policy.

Noteworthy is that RTIPPA (and the Evidence Act), make provision for dissemination of this information to hospitalists for approved mortality rounds and peer review. However the focus of these meetings is an examination of the quality of care delivered during the decedents' last admission rather than addressing a coronial PME critical value. Conclusion: The process for communicating critical values obtained from a coronial PME to surviving relatives is not widely known or understood. Forensic pathologists are not authorized to communicate directly with NOK or FDs. Many FDs are unaware of the fact that they do not have rights of access to PME reports. Critical value reporting is enhanced when processes are clear and well known.

11.4 It Walks Like a Duck, Quacks Like a Duck But It's a Horse: The Process of Second Opinion Expert Consultation, Independent Diagnosis of an Unusual Presentation of Rare Disease Process, and Truth-seeking by Experts in an Adversarial System

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A 3.5-month-old baby boy was found unresponsive by his father following a period of crying after a bowel movement. The father initiated resuscitation, and slapped him in the face in an unsuccessful attempt to arouse him. He was emergently resuscitated and admitted to intensive care, with severe neurological damage. Head CT showed subdural hemorrhage. Care was withdrawn, and he died approximately 37 hours after his collapse. The baby had been hospitalized for seven weeks for complications of prematurity, but was subsequently healthy. Forensic autopsy demonstrated: a patterned contusion on the face; subdural, subarachnoid, retinal and optic nerve sheath hemorrhages, some with evidence of aging and unusual features; and extensive cervical nerve root hemorrhages. The cause and manner of death were certified as "blunt trauma to the head" and "homicide." The father was arrested and incarcerated for over two years awaiting trial.

Two forensic pathology consultants were retained by the defense to advise on medical issues including mechanism of injury and cause of death. The consultants conducted a two-year review which included independent examination of neuropathology specimens and submission of additional microscopic examination with special stains, which culminated in a diagnosis of a natural death caused by chronic meningitis with vasculitis. The newly developed medical evidence was shared pretrial with the prosecution and the forensic pathologist who performed the autopsy; the pathologist agreed with some of the new findings, but the death certification was not changed. At trial, the father was acquitted following presentation of the medical evidence. The defense consultants later approached the authorities to consider amending the death certification, in light of the new medical evidence and the evidence presented at trial by both State and defense expert witnesses.

This presentation will discuss and explore:

- the unusual disease that caused this death and the diagnostic process that revealed it;
- controversial aspects of abusive head trauma and cervical spine pathology;
- the process of expert consultations in criminal cases, including assessing sufficiency of provided evidence, and interacting with the autopsy pathologist regarding diagnostic disagreements (i.e., truth-seeking in an adversarial process);
- appropriate medical bases for opinions expressed in legal proceedings;
- the use of expert consultants in guiding trial counsel, and assisting in crafting trial strategy and evidence presentation; and
- whether retained experts should attempt to be involved in collateral processes beyond consultation and testimony.

11.5 Duty to Warn: Implications for Medical Examiners in Young Sudden Death Cases

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The duty to warn is an important legal and ethical issues affecting medical examiners. In sudden death cases, genetic susceptibility, is an emerging issue in forensic pathology where duty to warn applies. The scenarios where duty to warn for an inherited susceptibility in sudden death cases include the need to notifying at-risk family members regarding risk for sudden death as well as notifying organ banks regarding organs that have been donated that have a higher susceptibility to disease post-transplant. Case examples will be used to review current recommendations regarding duty to warn for genetic conditions. Current tools and methods to notify at-risk family members will be shared. In addition, existing policies for

communicating back to donation banks, including sperm and egg donation banks, will be discussed. As genetics continues to be implemented in the forensic pathology community, medical examiners need to consider developing communication policies for notifying at-risk family members and organ procurement organizations regarding risk for the living to reduce their risk for sudden death.

12.1 A River Runs Through It: Bridge Jumpers in Spokane County, Washington

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A series of regionally publicized deaths involved bodies recovered in the Spokane River in 2016. Newspaper accounts of these deaths implied a conspiracy based on public and reporter misconceptions about individuals who die by bridge jumping into water. Data was collected on 16 bodies recovered from the Spokane River between 2007 and early 2018. The bridge jumping episode was witnessed or documented by videotape in 11 of the 16 deaths. The majority of the decedents (7/11) jumped from the Monroe Street Bridge, which has a height of bridge floor to water of 135 feet. The calculated velocity of impact from the Monroe Street Bridge is 54 miles/hour (80 feet/second). This velocity is lower than velocities in jumps from the Golden Gate Bridge, the Aurora Bridge in Seattle, and the series from bridges in the Charleston Harbor, South Carolina. Jumpers into the Spokane River die of blunt impact injuries, drowning, hypothermia, or of varying combinations of these three. The tendency of the human form to assume a horizontal orientation at freefall is correlated with injuries in these bridge jumpers. Eight of 11 witnessed jumpers had chest injuries, also most commonly seen in larger series of jumpers landing in water, and thought indicative of horizontal impact. New in this series is a description of the common finding of loss of clothing and damage to clothing during the jumping into water impact. In the 11 witnessed jumpers, 5 were missing items of clothing (excluding loss of shoes). Several of the remaining 5/11 had clothing that was ripped or displaced in position. Clothing loss is attributed to landing and turbulence (LAT).

12.2 Implementing Autopsy Recommendations from the Sudden Death in the Young (SDY) Case Registry

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Background: The Sudden Death in the Young (SDY) Case Registry is a collaborative effort between the National Institutes of Health, Centers for Disease Control and Prevention, and the Michigan Public Health Institute. The Registry's Autopsy Protocol Task Force developed guidance and recommendations on information to collect during death scene investigations, family interviews, and autopsies to standardize death investigation practices for SDY cases. The task force was comprised of medical examiners, coroners, death investigators, pediatric-, cardiac- and neuro- pathologists and clinicians, genetic counselors, emergency room physicians, and public health experts. Guidance about relevant information to collect is organized into SDY Tools including: the SDY Field and Family Form, the SDY Autopsy Summary, and the SDY Autopsy Guidance document. We used the Registry data to assess the frequency of autopsies and use of Registry tools.

Methods: We assessed autopsy practices among the 10 Registry states/jurisdictions who entered data into the National Fatality Review Case Reporting System (NFR-CRS) on SDY cases from 2015 through 2017. We calculated how many cases had an autopsy and how many cases reported using the SDY Autopsy Summary or Guidance. We also compared differences in the ability to assign an SDY category, per the

SDY Case Registry algorithm, by if the SDY Autopsy Summary or SDY Guidance were used.

Results:As of April 2018 (data downloaded 4/9/18), data were entered into the NFR-CRS for 1,459 SDY cases. An autopsy was performed in 92% (n=1,341) of cases. Of those, the SDY Autopsy Summary or Guidance was used in 44% (n=589) of cases. Among cases that were autopsied, the category was missing or *Incomplete Case Information* in 94% (552/589) of cases when the SDY Autopsy Summary or Guidance was used, and 77% (578/752) of cases when it was not used or the variable was missing or unknown.

Conclusions:Autopsies on SDY cases play a critical role in understanding, and monitoring deaths. Utilizing tools developed by the SDY Registry increases the likelihood that enough information is available at review to improve understanding of underlying etiologies. The SDY Case Registry will work with current and future states/jurisdictions to increase autopsy rates in SDY cases and increase the implementation of SDY Case Registry tools into existing local practices. This will improve data collection that will be used to inform health statistics and prevention efforts.

12.3 Unraveling a Triple Homicide Dismemberment

J.L. Hammers, J.L. Hammers

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Dismemberment cases are investigated and examined by most forensic pathologists at some point in one's career. It is not common to have more than one dismembered body identified in one location. Here we present a complicated case of three homicide victims who were shot, stabbed, cut. Their bodies were dismembered and comingled before being moved and buried in the ground during a hurricane. The decedents were missing for some time while investigators looked for them, only to discover the location where the bodies were buried through intense investigation. The bags containing the decomposing, wet, and dismembered decedents were excavated and brought to the medical examiner's office for examination, identification, and determination of cause and manner of death. We will describe the challenging 2.5 day process used to reunite the dismembered decedents, identify the decedents, perform external and internal examinations, document findings, and collect and preserve evidence. We will discuss decisions that were beneficial to this process and decisions that may have proved helpful. Additionally, we will discuss the investigation, arrest, motives, and trials of the three persons accused of performing the murders, dismemberments, and burial for completion of this interesting story.

12.4 Not So Straightforward Hanging Deaths

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While the majority of hanging deaths are relatively straightforward when opining the manner of death, rare cases require the forensic pathologist to seek additional information in order to conclude an opinion regarding the manner of death. On review of the 550 hanging deaths performed at multiple forensic pathology centers over an 11-year period, three cases were given an undetermined manner of death due to unique circumstances: 1) 43-year-old male with a history of depression and suicidal attempts found in a residence that is suggestive of, but not definitive for, autoerotic asphyxia; 2) 12-year-old male who was known to perform pranks, had an argument with his mother prior to hanging himself, and on review of his cell phone revealed a search regarding how to prank a sibling with a rope; 3) 10-year-old female who was known to hang articles of clothing from her bunk bed as decorations, was not reported to have any knowledge of the "choking game", and was reportedly looking

forward to the start of the school year. These three cases highlight the potential benefit of initially signing the death certificate as pending in order for additional information to be obtained. A pending death certificate may be appropriate in several cases, including: 1) initial reported medical history does not identify a history of mental disease or life stressor that could potentially lead a person to take his/her life; 2) death scene is inconclusive regarding the role of accidental activity, which includes evidence of solitary sexual activity; 3) decedents, often under the age of 18, who may be more influenced by peers and social media to engage in more risk-taking behaviors. Before opining a manner of death in these cases, forensic pathologists are encouraged to consider the following points: 1) engage families early and often, who may provide important insight into the decedent's actions and intentions; 2) expand and contact the network of individuals, which may include supervisors, co-workers, teachers, classmates, and friends, who may have additional information about the decedent; 3) request the decedent's technologic devices and social media use be examined for clues into the decedent's interests; 4) undetermined manner of death may be most appropriate for certain hanging deaths; 5) if additional information becomes available after a manner of death is determined, objectively review the information to ensure the manner of death is the most reasonable, logical, and accurate.

12.5 Preventing Consumer Product-Related Deaths: The Vital Role of Medical Examiners

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There are approximately 43,000 consumer product-related deaths and consumer product-related deaths, injuries and property damage cost the U.S. more than \$1 trillion annually. The purpose of this presentation is to describe the Medical Examiners and Coroners Alert Project (MECAP) and how medical examiners contribute to product safety through collaborative efforts with a federal agency, the Consumer Product Safety Commission (CPSC).

CPSC protects the public from unreasonable risks of injury or death associated with the use of products within the agency's jurisdiction. CPSC conducts epidemiological studies to estimate consumer product-related deaths and analyzes factors contributing to deaths through in-depth investigation of incidents. Results are used by CPSC to set priorities, support ban or recall of hazardous products, support development or evaluation of product standards and to educate the public. CPSC received approximately 5,300 MECAP reports annually from more than 100 medical examiner and coroner offices during 2013-2017. About 7.5% are associated with in-depth investigations.

Data collection through the MECAP is designed to collect fatality information in a detailed and timely manner. Detailed accounts of deaths enable specific product identification and allow CPSC staff to understand the interaction between product and person. Timely data submission enables CPSC staff to investigate deaths while products involved are available for examination and details of the incident are remembered by witnesses, experts and next of kin. The faster an incident is reported, the quicker CPSC may implement preventive strategies for mitigation of risk, such as product recalls.

Most recently, medical examiner reports have contributed to vital agency work to prevent tip-over injuries and deaths. Between 2000 and 2016, 514 tip-over fatalities were reported to CPSC, with 65% involving televisions (35% only televisions and 29% televisions and furniture). The source of these data included, but were not limited to, reports from medical

examiner offices. As a result, CPSC launched its "Anchor It" Campaign in early 2015, a national public education campaign to prevent furniture and television tip-over incidents from killing and seriously injuring children. Currently, CPSC engineers are working with furniture manufacturers to develop revised voluntary product standards related to furniture stability.

CPSC's work to ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters, and household chemicals - contributed to a decline in the rate of deaths and injuries associated with consumer products over the past 45 years. Medical examiners have a critical role to play in CPSC's success.

12.6 Equine Fatalities: Classifying Mechanisms of Injury and Use of Occult Hoof/Impact Pattern to Assist In Injury Classification. *K.V. Crowns¹, M. Montonera¹, J. Pinckard¹, A. Segovia²*

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Human interaction with the *Equidae* family (horses, donkeys, and mules) ranges from leisure activities and sports to ranching. In the United States equestrian sports are the most common cause of traumatic brain injury and equestrian related injuries result in more hospitalizations than motorcycle and other sports related injuries. However, only 100 - 105 deaths/year are the result of equestrian related injuries. The low number of equine related deaths along with the practice location of many forensic pathologists limits experience investigating these deaths.

Equines can weigh up to 1000 pounds, reach speeds of 40 miles per hour and kick with a force between 8000 - 10,000 Newtons - force equivalent to 1.8 times their body weight. Mechanisms of injury among mounted and unmounted individuals also include: fall, crush, striking object while riding, entangling in stirrups/ reins, blow from the horses' head, stepping and biting.

We examined Equine related fatalities from the Travis County, Texas Medical Examiner's Office and the Cook County, Illinois Medical Examiner's Office from 1986 - 2018. The activities in which decedents were engaged ranged from riding, working, to sexual intercourse with the horse. The incidents were typically unwitnessed and individuals were found unresponsive in a field or stable.

In both groups the majority of deaths were from head/neck injuries followed by injuries to the torso/pelvic. Most deaths resulted from a fall during horseback riding. When riding, the rider's head can be 8 - 10 feet above the ground, a fall from this height can cause significant trauma. Kick injuries, either to the head or torso were the second most common fatal mechanism.

Investigating these uncommon deaths is difficult because the incident is often either unwitnessed or partially witnessed. Recognizing occult hoof/impact patterns in conjunction with the pattern of internal injuries can help determine if the injury occurred when the individual was mounted or unmounted. Hoof prints are unique to the species, and to individual equine within the species, so the hoof print can be matched to a particular animal.

Correctly classifying injury mechanism may provide useful information for injury prevention (use/efficacy of protective equipment) and increase public awareness how injuries occur (fall instruction - release the reins and roll away from animal).

12.7 The Utility of Post Mortem CT Angiography in Forensic Practice

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Post mortem CT imaging has been a routine component of medicolegal death investigation at the Victorian Institute of Forensic Medicine since

2005. Following unenhanced scans, post mortem CT angiography can provide valuable targeted diagnostic information that can be a powerful adjunct to traditional autopsy techniques. However it can also be time consuming and subject to artefact, and is of limited utility in some settings. The Victorian Institute of Forensic Medicine's experience of 320 post mortem CT angiographic examinations in reviewed, with a focus on scenarios in which post mortem CT angiography is of greatest utility in the forensic setting. Limitations and potential artefacts will also be discussed.

12.8 Rehydrating Desiccated Hands in less than 24 Hours: A Comparison of Two Methods

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Positive identification of human bodies is one of the main responsibilities of Medical Examiner and Coroner Offices. In most cases accepted by the ME/C offices, identification is typically established visually by family members or acquaintances, either directly or through the use of photographs. However, because of the onset of decomposition and the inaccuracy of visual identification in such situations, many cases will require that identification be established through scientific methods. Given the relatively easy process of collecting fingerprints and the large number of individuals included in national databases, fingerprinting is the most widely used method of scientific identification. Unfortunately, good quality prints are not easily obtained in cases where bodies are in advanced stages of decomposition. In these cases, modified fingerprinting techniques are required, which can be time consuming and cost prohibitive for offices that do not have the personnel, knowledge or resources to perform such tasks.

The aim of this study is to recognize, develop and validate a simple method to obtain fingerprints in one of the more difficult situations, namely desiccation of the hands. Cases with severe desiccation that precluded routine fingerprinting were identified, and a dissection of the fingertip pads was performed. These fingertip pads were then subjected to a rehydrating process using different solutions, namely I.D. Enhancer Solution ® and Sodium Hydroxide solutions of different concentrations. The fingerprints subsequently obtained were compared. The results reveal that I.D. Enhancer Solution ® is a better solution in rehydrating desiccated fingers, necessitating less intervention with a faster turnaround time.

12.9 Casualties of War: An early Investigation of a War Crime by the US Military

W.C. Rodriguez

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The US military throughout time has played a major role in the development of forensic pathology including developing the first accredited Forensic Pathology fellowship in the US. One of the early forensic investigations conducted by the military was the case of the gang rape and murder of an eighteen-year-old Vietnamese woman by American soldiers during the Vietnam War. The incident which took place in 1966 was investigated by a military forensic pathologist, an Army civilian forensic anthropologist, and an army CID agent. The case which gathered much media attention at the time was penned into a magazine article in 1969 then later a book by author Daniel Lang. As a result of the book publication famed movie producer Brian De Palma along with screen play writer David Rabe brought the story to the movie screen in 1989 as a war drama film entitled *Casualties of War*. Two of the main cast members featured in the film included Michael J. Fox and Sean Penn.

The incident depicted in the movie initiates at the outset of a search for enemy hideouts being utilized by the Vietcong. After a lengthy stint conducting search and destroy missions the army platoon was expecting to be granted lengthy R&R leave however instead they were denied their R&R and assigned another dangerous mission back into the jungle to search out the Vietcong. The platoon leader extremely upset at the redeployment informs his men that he intends to commandeer a woman from a Vietnamese village and bring her along with them for amusement by raping her repeatedly. He also informs his platoon once their mission is over, they will kill the girl, thus destroying the evidence of the abduction and rape. One of the platoon members objects to the kidnapping and raping of the young girl and does not participate which puts him at great odds with the platoon sergeant and members of the platoon. Later after the murder of the young girl the private who did not participate in the rape, torture and killing reports the incident to the military command. Multiple threats were made against the loan private including one in which he nearly was killed. The military command pressed by the seriousness of the allegations ordered the recovery of the remains and a forensic pathological examination. As a result of the examination evidence of stabbing and gunshot trauma was noted corroborating the war time atrocity.

W1 Learn to Lead in Forensic Pathology From Chief Medical Examiners - Breakfast Workshop

M. Aurelius

NC Office of the Chief Medical Examiner, Raleigh, North Carolina, USA

Our greatest forensic leadership resources are our current and past leaders. Develop a deeper understanding of how our Chief Medical Examiners approach challenges and inspire others by attending this moderated interactive question and answer breakfast workshop. Previously titled the Chief's Breakfast, this session will highlight the experiences of three successful Chief Medical Examiners. Topics that will be explored include administration, personnel issues, program innovations, budget management, leadership training, problem solving, and effective leadership styles. Former and current forensic pathology leaders are also invited to attend to share their experiences and interact with attendees who are interested in becoming future leaders. According to Daniel Goleman's *Leadership That Gets Results*, a 2000 *Harvard Business Review* study, there are six leadership styles that effective leaders use. The Authoritative leadership style mobilizes people toward a vision and is considered to have the most positive impact on the organization. The Coercive leadership style demands immediate compliance and has the most negative impact on the organization.

W2 Forensic Pathology-Relevant "Patient Safety" Course

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This Patient Safety Course (PSC), written and delivered by the members of the NAME Subcommittee for the Development of Self-Assessment Modules (SAMs), is designed to satisfy the American Board of Pathology Continuous Certification (CC) requirement (as specified by the American

Board of Medical Specialties). Each diplomate participating in CC (formerly Maintenance of Certification, MOC) is currently required to complete an approved PSC once during each 10-year cycle. While there are PSCs offered by other organizations in general medicine and in general anatomic and clinical pathology, this course will be the first that is focused in and specific to forensic pathology. The course will present a number of short modules on a variety of topics relevant both to patient safety and forensic pathology. Topics include critical values in forensic pathology and their management, the autopsy and quality assurance, human factors in error, epidemiology of error, the culture of safety, systems thinking and root cause analysis, and quality improvement and models for improvement. Case examples from the everyday practice setting of Medical Examiners will be used to illustrate. SAM credits will be available.

POSTER PRESENTATIONS

P1 A Peculiar Case of Suicide with an Air Rifle: Multiple Wounds, Minimal External Blood Loss, and an Ingested Tooth

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Air-powered weapons use compressed air (or gas) to launch a projectile. They are commonly used for target shooting, sports, and firearms training. Fatalities and injuries related to air-powered weapons are most commonly accidental shootings. While the use of traditional firearms to commit suicide is prevalent, it is relatively uncommon to use an air-powered weapon as a mechanism for suicide.

We report a case of a 56-year-old man who was found sitting on his bedroom floor. On his forehead was a small, round wound surrounded by minimal dried blood. Another small, round wound was found on the left upper chest, with no external bleeding. Law enforcement discovered a 0.177 air rifle about 25 feet away from the decedent on the living room couch and a few (4) drops of blood on the living room floor. There was no evidence of a struggle. Law enforcement was suspicious for a possible suicide.

Postmortem radiographs revealed four radiodensities: two in the head, one in the chest, and one in the right lower abdomen. External examination revealed wounds of the forehead, chest, and an intraoral wound on the soft palate. Three 0.175" metal pellets were recovered; one from the subcutaneous tissues of the forehead, one from the sphenoid/occipital bones, and one from the posterior wall of the heart (with an associated 400 mL hemopericardium). Neither of the head wounds entered the cranial vault. Incidentally, the fourth radiodensity turned out to be an ingested tooth found within the large bowel and is presumed to have been traumatically avulsed with the intraoral shot. It was concluded that the decedent died from multiple (x3) self-inflicted air rifle wounds.

The lack of fatal injury associated with the head wounds and the limited (likely non-immediate) injury associated with the chest wound explain the crime scene findings that originally seemed discordant with a manner of suicide: multiple seemingly fatal wounds with minimal blood loss and a greater than usual distance between the decedent and the air rifle. The ingested tooth in the large bowel suggests that death was not instant/immediate and lends additional support for the lack of proximity between the decedent and the air rifle.

In suicide cases, multiple wounds are not typical, and the weapon is often found within reach of the decedent. But, in this case, the autopsy findings,

coupled with an understanding of air-weapon injuries, corroborated the crime scene findings and supported a manner of suicide.

P2 Opiates and the Possible Link to Suicide The Effects of Opiates/Opioids on the Brain

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Purpose: This research examines toxicology findings for opiates/opioids in individuals with the manner of death ruled as suicide in New Hampshire. This was to test the hypothesis that a significant number of these individuals were opiate/opioid dependent.

Methods: Toxicology reports on all suicide deaths were examined for opiates/opioids from January 1, 2014 through December 31, 2016. Each case report for individuals positive for opiates/opioids was examined for evidence of abuse and dependence. The criteria for dependence was determined by reporting family member or physician.

Results: There were 711 suicides in New Hampshire from January 1, 2014 through December 31, 2016. Of these, 176 (25%) had opiates/opioids present in their toxicology. Of these, 127 (72 %) had historical evidence of opiate/opioid dependence reported. These findings prove to be statistically significant when a standard t-test was performed ($p < 0.05$).

Conclusion: Few studies have attempted to determine a relationship between suicide and opiate/opioid abuse and dependence. The results of this research validates a need for more studies in order to correlate a possible link between the effects of opiate/opioid abuse and suicide.

P3 Exploring the Potential of microRNAs and circRNAs in the Estimation of PMI

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Introduction

The precise estimation of postmortem interval (PMI) is a critical step in death investigations of forensic cases. Detecting the degradation of RNA in tissues by real time quantitative polymerase chain reaction (RT-qPCR) technology provides a new theoretical basis for estimation of PMI. However, most commonly used reference genes degraded with death time extension, while previous studies seldom considered to select suitable reference genes for estimation of PMI. MicroRNAs (miRNAs) and circular RNAs (circRNAs) had high stability and were considered as potential reference genes in PMI estimation.

Material and Methods

Mouse heart, liver and skeletal muscle tissues were collected through a realistic natural conditions, animal model (0, 1, 2, 3, 4, 5, 6, 7 and 8 d; n=5 mice per time point), and detected the degradation of RNA in tissues by real time quantitative polymerase chain reaction (RT-qPCR) technology. Then, we evolved the stability of 11 candidate genes (β -actin, Gapdh, Rps18, 5S, 18S, U6, miR-133a, miR-122, circ-AFF1, LC-Ogdh and LC-LRP6) by geNorm and NormFinder algorithms. Finally, we established mathematical models of PMI by GRAPHPAD v5.0.

Results

The suitable reference genes varied across tissues with miRNAs and circRNAs basically more stable than other kinds of RNAs regarding PMI estimation. For target biomarkers, U6 ($\Delta\Delta Ct$) was found to exhibit the best correlation coefficient with PMI in advanced stage and was employed as a biomarker to build mathematical models of PMI. We used our tissue-specific reference genes to standardize the target biomarker and established mathematical models. Then, mathematical models were validated by animal samples. The estimated result of three kinds of

tissues were combined into a single unit, the estimated error was within 0.57 days.

Conclusion

First, the PMI within 8 days can be accurately predicted by RNA degradation using effective biomarkers. Second, comprehensive estimation of PMI based on various tissue results could improve the accuracy of PMI. Although the error rate of liver tissue could not be ignored, our estimated result of comprehensive analysis was practical.

P4 Postmortem Anthropophagy by Animals

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Postmortem changes are critical for forensic pathologists to differentiate when determining the cause and manner of death based on the pattern of injuries presented. Thorough examination and work up must be performed to elucidate the origin of injury inflicted upon the decedent. Postmortem animal scavenging, (known as anthropophagy) can lead to misinterpretations of findings, loss of data, and incorrect conclusions. With knowledge about this phenomenon and forensic expertise, one can correctly identify and determine animal activity that is antemortem versus postmortem. When classifying findings during the time of autopsy one should raise suspicion for animal interference when teeth marks are identified with minimal or no associated hemorrhage, primary sites of injury are of exposed areas of the body, patterns wounds of self-defense are not present, and the location of body recovery is one accessible to animals. Postmortem animal depredation is a common phenomenon that forensic pathologists should be familiar with, here we present two unique cases of postmortem anthropophagy by a shark and an alligator that occurred in the Hillsborough County, Florida.

In case one, a 73-year-old Caucasian female with past suicidal attempts was found after an abandoned car located on the number four suicide bridge in the country prompted a water search. The original water search was not successful until a local fisherman reported finding a body located in an area of heavy shark activity. A Caucasian female torso with one arm and one leg was recovered. Cause of death was determined to be blunt impact of torso with rib fractures and laceration of heart, great vessels, and lung. Manner of death was suicide, jumped from bridge.

In case two, an 81-year-old Caucasian male was found face down in a pond behind his nursing home, a couple feet from the shoreline. The decedent was found with obvious signs of decomposition. On external examination changes consistent with postmortem animal activity were documented to include, multiple irregular defects extending to the facial bones to involve the loss of the left and right ear and postmortem partial amputation of the right arm. The cause of death was drowning with the contributing factor of Alzheimer's Dementia. The manner of death being an accident.

Here we highlight the importance of a thorough investigation or examination to uncover modifications made postmortem by animal activity and avoid misclassification as a potential cause of death.

P5 Hostage Situation Homicide

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Hostage situations present a number of scenarios that can result in gun violence and the loss of life. In these scenarios, police often surround the area where the hostage-taker is located with their victim(s). While negotiations are sometimes successful and hostages are released

peacefully, the perpetrator can also commit gun violence against the police, the hostages, and themselves. Gun violence directed from police toward the perpetrator may also occur, and occasionally, hostages may be the inadvertent victims of police gunfire. The police in these situations are trained to be patient, but must act quickly to bring a swift resolution to the situation if an armed perpetrator appears to be in the act of inflicting gun violence.

We present the death of a 74-year-old woman, who was a victim of a hostage situation. She was taken hostage by her ex-husband in his home, where he was reportedly threatening to kill her. After successful police negotiations with the perpetrator, the woman was released by the perpetrator and was exiting the residence with her walker when her ex-husband appeared at the door brandishing his firearm. A police officer had a rifle with a scope trained on the man, and when the man brandished his weapon, the officer fired at him. However, the woman was struck by the projectile, and she immediately collapsed to the ground. Despite attempts at resuscitation, including transport to the emergency department, she was pronounced dead. In reconstructing the events of the shooting, it was determined that the pathway of the bullet was deflected by an automobile behind which the shooting officer was positioned, and the round's trajectory was significantly diverted from its intended target. A complete autopsy was performed. The manner of death was homicide. The cause of death was a rifle wound of the chest.

The case is presented, along with a discussion regarding important aspects of the scene investigation and autopsy which led to the reconstruction of the event and proper certification of the death as a homicide. A review of proper firearm safety principles is also provided. Had the officer remained diligent in following these principles, this tragic event would likely have been prevented.

P6 In-Custody Death Due to Unrecognized Meningitis

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The effects of the opioid epidemic are far-reaching in Ohio. We present a case of a 46-year-old female inmate with a 24 hour history of vomiting, headache, guarded head movements, and altered mental status, who was found unresponsive in her cell and transported to a local hospital. Within the same 24 hour period, a fellow inmate had been caught smuggling methamphetamine to her incarcerated peers. Due to the unfortunate timing of the two events, the decedent's diagnosis was presumed to be acute intoxication with encephalopathy. On admission to a local hospital, she was unresponsive to Narcan and had a negative urine drug screen. Seizure activity was observed in the emergency department. Pertinent vital signs included a 101°F rectal temperature, tachycardia, hypotension, and a rapid respiratory rate. Lab findings included thrombocytopenia, lactic acidosis, and a normal white cell count. A CT of the head demonstrated findings consistent with anoxic encephalopathy. An MRI of the head was unremarkable. Empiric antibiotics were started. A blood culture, taken at the time of admission, returned as positive for *Streptococcus pneumoniae*. A lumbar puncture was never performed. Despite medical treatment, she was pronounced brain dead 2 days after admission. At autopsy, the brain displayed diffuse meningeal opacification with green discoloration, flattening of the gyri, narrowing of the sulci, bilateral tonsillar herniation, and parenchymal softening and friability. Histologic examination of the brain revealed a thick, neutrophil-predominant inflammatory exudate and numerous gram positive cocci in pairs and small clusters in the subarachnoid space. Acid-fast and fungal stains were negative for organisms. The cause of death was bacterial

meningitis; the manner of death was natural. Our case report of an inmate with a straightforward but missed diagnosis of bacterial meningitis highlights the dangers of presumption while practicing medicine in the center of an opioid epidemic. This presentation includes a comprehensive review of the clinical features and autopsy findings in bacterial meningitis, as well as a discussion of deaths during incarceration.

P7 Ketamine Intoxication from a Topical Preparation Contributing to Heart Disease

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Ketamine is a well-known dissociative-anesthetic. Fatalities involving ketamine are rare, given its wide therapeutic margin. Most case reports of fatalities involving ketamine were instances where ketamine was mixed with other drugs of abuse and not as a sole cause of intoxication. Unlike most anesthetic agents, ketamine increases blood pressure. We report a case of ketamine intoxication from a topical preparation contributing to underlying heart disease that resulted in death. This case report will increase awareness about another situation where ketamine can contribute to death. The decedent was a 50-year-old male with a history of poorly controlled hypertension, surgically repaired ascending aortic aneurysm and dissection with medial degeneration, chronic dissection of the descending thoracic aorta, bicuspid aortic valve, cerebral palsy, and chronic leg pain due to non-healing ulcers. He also had a history of acute psychosis related to methamphetamine intoxication with bizarre behavior and hallucinations. His wife found the decedent dead in his home. He was supine on the floor of his living room, unclad. There was a prescription of ketamine gel along with the associated receipt of purchase one day prior. The scene investigation did not indicate any evidence of altercation. Autopsy revealed left ventricular hypertrophy with 4 chambers dilation. There was nephrosclerosis. The aortic dissection tract extended from aortic arch to level of renal arteries with an adherent thrombus. The synthetic graft anastomoses used in the dissection repair was intact. There was a porcine bioprosthetic valve in aortic position, with focal fibrin thrombus. Neuropathologic examination revealed mild cortical congestion and edema, and early ischemic neuronal injury of the cortex and hippocampus. Toxicological examination of femoral blood revealed ketamine (concentration 2400 ng/mL) and its metabolite norketamine (concentration 1900 ng/mL). The reported plasma concentration at which analgesia achieved is 150 ng/mL. Ketamine blocks N-methyl-d-aspartate (NMDA) receptors on sensory nerve endings and is used in topical analgesic preparations for chronic pain. Topical preparations containing ketamine typically do not result in systemic toxicity, which raises the possibility for another mode of use, such as ingestion, that resulted in systemic absorption; although few reports in the literature reported non-lethal systemic toxicity with the use of topical compounded pain creams. Ketamine inhibits re-uptake of circulating catecholamines, which can result in increased blood pressure and heart rate. Ketamine also may depress ventricular function. In the setting of preexisting heart disease this could contribute to the development of a fatal arrhythmia, as seen in this case.

P8 A Competitive Eater with Purging Induced Electrolyte Abnormalities and Prolonged QT Interval

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Introduction

Professional competitive eating has experienced an explosive growth in popularity over the past decade. Common practices may include stomach capacity training, in which large amount of food and/or fluid is ingested,

often followed by self-induced purging behavior, resulting in significant fluid and electrolyte shifts.

Case Report

A 29-year-old woman was found unresponsive in her bathroom by a roommate three days after participating in a competitive eating contest. Numerous dietary supplements and weight loss pills were found throughout her residence, as well as evidence of a recent large meal. She had a history of multiple syncopal events related to her dieting methods, and she was previously hospitalized for complications of purging behavior, including metabolic alkalosis with severe hypokalemia, hypochloremia, and borderline hyponatremia, resulting in significant QT interval prolongation.

At autopsy she was a well-nourished young woman with a body mass index of 25 kg/m². Evidence of repeated purging behavior included mucosal injury of the epiglottis with reactive lymphoid follicular hyperplasia, an erythematous nodule at the right aryepiglottic fold, and ulceration of the esophagus. An epidermal inclusion cyst had developed at the base of the tongue. The stomach had prominent rugae grossly and chronic gastritis microscopically. Widespread glomerular sclerosis and renal cortical calcification was also seen. Postmortem analysis of vitreous fluid revealed decreased sodium (125 mmol/L) and chloride (100 mmol/L) concentrations. Toxicologic testing detected caffeine only.

Discussion

Medical history, scene evidence, and autopsy findings indicated that the decedent had an eating disorder involving binge eating and purging. An increased risk of death in patients with eating disorders has been described. In disorders involving bingeing and purging behaviors, large, rapidly changing fluctuations in stomach content and volume can result in significant body fluid shifts. Metabolic alkalosis with underlying electrolyte abnormalities, including hypokalemia, hypochloremia, and hypophosphatemia is more common in increasingly severe purging behaviors. Excess vomiting can cause the electrolyte disturbances discovered on this woman's vitreous screen, as well as hypokalemia, which she had previously experienced. These electrolyte abnormalities would have predisposed her to the development of potentially fatal arrhythmias, likely causing her sudden death.

P9 Phencyclidine-Associated Rhabdomyolysis and Disseminated Intravascular Coagulation

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Introduction

Phencyclidine is a hallucinogenic drug which has been abused for many decades and the illicit use is increasing in various metropolitan areas across the United States. Publications regarding phencyclidine use have generally focused on its mind-altering effects with limited focus on the severe physiologic effects of various organ systems which can result in death. This case report describes a 45-year-old African American female who died of multi-organ failure as a direct result of phencyclidine use.

Case History

A 45-year-old African American female with a reported social history of chronic phencyclidine and marijuana use was found unconscious in her home during a welfare check. She was conveyed to the hospital where results included hemoglobinuria associated with a low hemoglobin level (6.4 mg/dL), acute liver failure, and myoglobinuria-induced acute renal failure secondary to rhabdomyolysis. Her condition was determined to be attributable to the toxic effects of phencyclidine which was positive on a urine drug screen. Despite medical intervention, she died as a result of multi-organ failure less than 24 hours after hospital admission.

Results

Autopsy findings revealed minor abrasions on the face and extremities, and a small contusion on the left arm. There were no major external injuries. The internal examination of the body revealed cerebral edema, pulmonary edema and congestion associated with hydrothoraces, a hemorrhagic large bowel associated with 1 liter of blood in the peritoneal cavity, and a hemorrhagic bladder mucosa. There were no sites of internal traumatic injuries. Histology revealed cerebral hypoxia, extensive liver necrosis, acute tubular necrosis, and hemorrhagic necrosis of the intestine. Toxicology results were positive for marijuana and revealed a high concentration of phencyclidine (0.36 mg/L) in the hospital admission blood.

Discussion

The cause of death was complications of phencyclidine use and the manner of death was classified as an accident. Often, published information of phencyclidine use focuses on the behavioral effects of the drug with emphasis on deaths related to violent and bizarre acts as a result of phencyclidine intoxication. In consideration of the case report findings, it is important to recognize that the toxic effects of phencyclidine can also lead to non-traumatic rhabdomyolysis and thereby the development of disseminated intravascular coagulation.

P10 Chronic Ascending Aortic Dissection:Rationale For Manner Of Death Classification

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Introduction

Ruptured aortic dissections are commonly a complication of hypertensive vascular disease and are often classified as natural. When this abnormality is found in the context of volatile circumstances, homicide is a potential manner of death classification. However, this case report presents a manner of death classification challenge of chronic ascending aortic dissection in the context of volatile circumstances.

Case History

A 61 year-old homeless, Asian female with a medical history of hypertensive heart disease was arrested for shoplifting. She reportedly was belligerent prior to the arrest. While in custody she was slapped in the face by another jail occupant. Hours later, she was eventually released and transported to a shelter. Soon after, she was transported to the hospital with a complaint of left cheek pain where she was hit and a headache. During her hospital stay, multiple studies were done and she was reportedly momentarily restrained. With exception of the left cheek hematoma and an old cerebral infarct, head and neck CT scans revealed no traumatic injuries. Four hours later, while in the emergency room, the decedent began to complain of back pain and was then admitted to the medical floor for further observation. The following morning, she was found unresponsive and despite cardiopulmonary resuscitative efforts, she died.

Results

Autopsy findings revealed a bruise on the left cheek, a remote cerebral infarct associated with severe cerebral atherosclerotic disease, a ruptured ascending aortic dissection that extended to both common carotid arteries and to the level of T2 vertebra associated with a hemopericardium, bilateral hemothoraces, a hypertensive heart, and arterioneurophrosclerosis. Histology revealed a dissected thickened aorta with an organized blood clot in the false lumen. Toxicology results were negative.

Discussion

The circumstances surrounding the death are complex and varied, thus creating difficulties in classifying the manner of death. Stressors can potentially lead to the development of an aortic dissection. Individually,

certain stressors would lead to a classification of either homicide or natural. Regarding homicide classification, a stressor could result in an aortic dissection, but in this case the temporal relationship between the assault and the death is wide. As for a natural classification, histology results correlate with a chronic ascending aortic dissection. Nevertheless, given the chronic pathology of the condition and the decedent's history, additional stressors that could be relevant and that preceded the date of the arrest are unknown. Thus, undetermined is the appropriate classification.

P11 Forensic Autopsy Aids in Adjudication of a Murder Case

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BACKGROUND

The most common methods used to commit homicide in the U.S. include firearms and knives. Occasionally, multiple methods are used in combination. No matter the cause, it is the forensic pathologist's duty to determine the cause of death. We present the case of a man who was shot and stabbed multiple times and discuss the implications of autopsy findings with regard to adjudication.

CASE REPORT

A missing person report was filed by an individual's mother, who suspected foul play by the primary suspect in the case. One week later, the suspect confessed and revealed the location of the victim's body, which was recovered and identified using fingerprints. Police searched the suspect's home and recovered several rifles along with .17 HMR ammunition.

Autopsy revealed multiple high-velocity gunshot wounds (GSWs) and sharp force injuries. A stab wound through the right temporoparietal region was found to have penetrated the skull, cerebrum, and brainstem. Two GSWs were found in the lower back, one of which fractured the L2 vertebra and transversed the cauda equina. Three GSWs had also hit the upper extremities, resulting in bilateral humeral fractures. All but one of the GSWs had a back-to-front path. The cause of death was determined to be sharp force injuries of the head and neck, with a contributing cause of multiple gunshot wounds. The manner of death was ruled homicide. During trial, it was revealed that the homicide resulted from a love triangle which the men had agreed to settle by fighting. Despite the fact that autopsy findings clearly showed multiple gunshot wounds to the victim's back, the suspect claimed that the victim had approached him with a knife and, believing his life to be in danger, shot him. The suspect was found guilty of 1st-degree murder and sentenced to life in prison.

DISCUSSION

Autopsy findings proved inconsistent with the suspect's story. The back-to-front path of the GSWs indicated the victim was shot while facing away, possibly while fleeing from the suspect. The bilateral humeral fractures would have resulted in inability to use the arms. The high-velocity injury to the spine and cauda equina would likely have caused loss of lower extremity function. Without the use of arms or legs, the victim was rendered incapable of defending himself against the knife wounds. This case demonstrates how autopsy findings provide information useful in elucidating the possible sequence of events involved in a homicide, aiding in adjudication.

P12 Cocaine Use and Pulmonary Embolism: Can Cause and Effect Be Established?

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Cocaine is an illicit substance used by an estimated 1.5 million individuals 12 years or older in the United States. Its toxicity and systemic effects include adverse events in the arterial system ranging from arterial spasm to arterial thrombotic events that can lead to increased morbidity and mortality. Despite this known arterial pathophysiology; there is no scientific literature directly linking cocaine and venous disease and, more specifically, a causal relationship between cocaine use and pulmonary embolism.

We conducted a 6-year retrospective study of deaths between 2012 and 2018 (year to date) at the Onondaga County Medical Examiner's Office (OCMEO). The OCMEO electronic database was searched for all cases in which pulmonary embolism was coded as the cause of death. During the study period, 72 such deaths were identified. The toxicologic findings in each of these deaths was review and cases were divided into cocaine-positive (n = 6) and cocaine-negative (n = 66) groups. For each group, demographic data and pulmonary embolism risk factors were evaluated. We will present the characteristics of the cocaine-positive and cocaine-negative groups, specifically attempting to identify if cocaine use may be an independent risk factor for the development of pulmonary embolism. In doing so, we will address cocaine's potential mechanisms of action in development of pulmonary embolism and also deep vein thrombosis.

P13 Acute Obstructive Hydrocephalus Secondary to Primary Intraventricular Meningioma: A Rare Cause of Sudden Unexpected Death

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Undiagnosed primary intracranial neoplasms occur in 0.04%-0.24% of cases of sudden death. While meningiomas account for 13-18% of all intracranial neoplasms, only 0.5-5% are intraventricularly based. Primary intraventricular meningiomas (IVMs) are thought to arise from arachnoid cap cells of the choroid plexus, typically within the trigone of the lateral ventricle. Although considered a benign neoplasm, this extremely rare entity can evade clinical diagnosis due to its unique location and non-specific symptoms, insidiously presenting as a sudden unexpected death. We report a case of a primary IVM in a 40-year-old male with a history of hypertension and medication non-compliance who complained of a headache for approximately one day. At 23:30 on a Friday evening, the decedent reportedly phoned 911 and was reportedly told there was nothing they could do to help. He was found deceased in the kitchen at approximately 03:30 on Saturday morning.

At autopsy, initial gross evaluation of the central nervous system demonstrated an edematous brain with a left to right midline shift and associated uncal and cerebellar herniation. Serial coronal sections revealed a well-circumscribed rubbery, firm, tan-pink, slightly lobulated 3.7 x 3.5 x 2.5 cm mass within the basal left lateral ventricle and left third ventricle with a pushing border. The mass extended into the left lateral ventricle with ventricular dilatation consistent with obstructive hydrocephalus. Duret hemorrhages were seen in the midbrain and pons. Histopathologic evaluation showed a highly cellular, lobulated, and whorled mass with few mitoses, psammomatous calcifications, increased vasculature, and tongues of invasion into adjacent brain parenchyma, consistent with an atypical meningioma (WHO Grade II). The surrounding parenchyma was edematous with reactive gliosis and foci of medial vascular calcification.

This case highlights a pathophysiologic mechanism of sudden death due to acute obstructive hydrocephalus secondary to a rare primary intraventricular brain neoplasm in a patient with headache. This non-specific symptom allows for a wide range of differentials, especially in the setting of hypertension and medication non-compliance, which further

emphasizes the importance of death investigation in cases of sudden death.

P14 Sudden Death Due to Atraumatic Spontaneous Esophageal Rupture: A Case Report

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Spontaneous esophageal rupture (Boerhaave's Syndrome) is an uncommon medical emergency that is associated with a high rate of morbidity and mortality. Patients who present with this condition must be recognized quickly due to the close inverse relationship between the patient outcome and the time between rupture and diagnosis. Rarely, cases have been reported which describe esophageal ruptures coinciding with tension pneumothorax and cardiac arrest; although, few are currently included in the forensic literature.

We report the unusual case of a 54-year-old female with a history of alcohol abuse and inflammatory bowel disease with colectomy and permanent stoma. She was found by authorities in a seated position with a piece of deli meat in her hand and partially masticated food in her teeth. Near the body, two partially-filled glasses of liquid were also noted, one with clear liquid and the other with carbonated amber liquid with a look and smell consistent with beer. Autopsy revealed a hole in the left lateral mid-esophagus and approximately 400mL of gastric fluid in the left pleural cavity. Also noted were areas of esophageal erosion and necrosis; no varicosities were present. We conclude that the decedent suffered sudden cardiopulmonary arrest due to acute esophageal rupture into the left chest. This case highlights a unique scenario in which inflammatory bowel disease may have predisposed the individual to a rupture of the upper gastrointestinal tract from the typically benign action of swallowing a carbonated beverage.

P15 Geospatial and Demographic Analysis of Suicide Modalities in an Urban Midwestern County

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Purpose: To evaluate suicide modality (gunshot, poisoning, asphyxia by hanging, jumping) and its relationship to demographic characteristics and location in an urban Midwestern county, 2003 to 2015. The relationship of opioids to suicidal poisoning is also examined.

Background: Suicide is a major and continuing public health concern in the United States. During 1999–2015, approximately 600,000 U.S. residents died by suicide in the United States, with the highest annual rate occurring in 2015 (CDC, 2016). Depth examination of suicide modality by geolocation and victim demographic characteristics has yet to be described in the literature.

Methods: The annual county-level mortality database from the Cuyahoga County Medical Examiner's office was used to analyze suicide rate trends during 2003-2015 in Cleveland and Cuyahoga County. Researchers examined and categorized all medications in the system of poisoning victims in order to explore the nature of suicidal poisoning, including its relationship to opioids. Analysis included t-test and one way ANOVA to determine demographic and residence related differences in suicide among the Northeast Ohio population. ESRI was utilized to map results at a zip code level.

Results: Of the more than 2,000 recorded suicide cases the most common modalities were self-inflicted gunshot (43.3%), asphyxia (32%; by hanging 24.6%), poisoning (14.8%), jumping (6.1%), and self-inflicted stabbing and other (3.7%). Suicide by gunshot was more likely among males, minorities, >70 years, and police/military, and blue collar. Asphyxia was more likely among children, Millennials, unmarried, and artists,

educators and students. Poisoning was more prevalent in females, divorcees, homemakers, Gen X, and baby boomers. Scheduled drugs were more commonly used in poisoning by whites. Three or more drugs were present in the system of 34.7% of poisoning cases. Among poisonings, 54.8% included scheduled drugs, 61.8% included at least one psychotropic medication, and 43.5% opioids. Spatial analysis revealed a distinct geographic pattern showing higher prevalence of most suicides and suicide modalities in predominantly white, blue collar zip codes.

Conclusion: Results demonstrate data organization that may inform the development of new interfaces and tools for the recording of suicide cases within medical examiner datasets. These tools may be used for more in depth analysis of suicide modality and related descriptive characteristics. Additionally, findings may be used to develop local suicide prevention approaches, with special emphasis on reducing the availability and accessibility of means for suicidal behavior.

P16 Fulminant Herpes Simplex Virus Hepatitis Following Burn Injuries.

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Herpes simplex virus hepatitis is a rare and often fatal complication associated with significant burn injury. Most reported cases of disseminated HSV infection are seen in states of immunocompromise including neonates, HIV-infected patients, those with cancer or myelodysplastic syndromes, and liver transplant recipients. Presentation can range from mucocutaneous lesions to visceral organ involvement of the lungs, liver, lymph nodes, spleen, and adrenal glands. We report a case of a 24-year-old female with no known medical history who presented to the emergency department with severe burns following a house fire. She was found to have partial thickness burns over 20% of her body, <1% full thickness burns, and suspicion for inhalation injury. She was intubated and mechanically ventilated as a precautionary measure but was expected to survive her injuries; however, she declined clinically over the next few days. She developed symptoms of pneumonia, sepsis, acute liver failure, pancytopenia, and disseminated intravascular coagulation. The patient died two weeks after her injuries with the development of acute respiratory distress syndrome.

Postmortem examination was significant for anasarca, thermal injury, marked hepatomegaly, and diffuse pulmonary consolidation. Patchy partial thickness (second-degree) thermal injury with granulation tissue formation was present on the face, neck, back and bilateral upper extremities, accounting for approximately 20% of total body surface area. Foci of full thickness (third-degree) thermal injury were present on the dorsa of both hands. Vesicular lesions were absent. Microscopic examination of the lungs revealed patterns consistent with early organizing diffuse alveolar damage in all lobes. Immunohistochemical staining for HSV was focally positive in the right lower lobe. Areas of extensive geographic necrosis were present in the liver along with ground glass nuclear inclusions, multinucleation, and margination of chromatin, consistent with HSV cytopathic effect. Immunohistochemical staining for HSV was positive. The cause of death was attributed to complications of thermal injury and inhalation of combustion products.

Frequently, the diagnosis of disseminated HSV infection is realized only upon postmortem examination. As in this case, many patients have no history of HSV infection and develop no skin manifestations. A high index of suspicion with early empiric administration of antivirals in acute liver failure could be life-saving.

P17 The Opioid Crisis: Out of Hand...and On Fire. A Case Report of an Unusual Opioid-Related Fatality.

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The opioid crisis continues unabated. Over the past few years, forensic pathologists have been inundated with an unprecedented increase in accidental overdoses and opioid-related fatalities, fueled largely by the ever-rising production and distribution of fentanyl and fentanyl analogs. To illustrate the wide-ranging effects of this international epidemic, we report the case of a 48-year-old man with no known medical conditions and a history of heroin abuse. A witness reported seeing him asleep or unconscious in the driver's seat of his parked car when smoke began pouring from the front hood of the vehicle. Subsequently, flames were observed coming from the engine compartment. The decedent awoke at this time but was too confused and panicked to successfully release his fastened seatbelt restraint. Due to his intoxicated state, he was ultimately unable to extricate himself from the vehicle as it was progressively engulfed by flames and smoke.

Examination of the vehicle by arson investigation experts revealed that the source of the fire was in the engine compartment. The seatbelt appeared to function normally. Drug paraphernalia recovered from the vehicle was limited to a burnt spoon. Postmortem examination of the body demonstrated diffuse charring of the head, torso and extremities with pugilistic posturing of the upper extremities. There was soot deposition in the oral cavity, trachea, larynx and esophagus and cherry-red discoloration of the internal viscera. Pulmonary edema was not present. Toxicology was positive for fentanyl, 6-monoacetylmorphine and low level carbon monoxide (6%). The cause of death was inhalation of smoke and superheated gases. Acute fentanyl and heroin intoxication was a contributing cause of death. The manner of death was accident. Multiple eyewitness accounts, a comprehensive scene investigation, and the postmortem examination, including toxicology results, collectively paint a vivid picture of the peculiar details of this man's death. This report highlights an unusual complication of fentanyl and heroin intoxication. Unlike in the majority of accidental opioid-related deaths, this man was not actively engaging in careless activities such as driving or using a lighter or matches while intoxicated and there was no evidence of overdose. Rather, the decedent's demise was the direct result of his altered cognition, which led to an inability to exit a normal, parked car in the event of a vehicle engine fire.

P18 Drug Toxicity and Sudden Death in Infants and Toddlers

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OBJECTIVE: Early childhood death from drug toxicity is uncommon. In fact, little data exist outside of case reports regarding lethal drug concentrations in young children. Herein, we aim to 1) describe six cases of drug toxicity in infants and toddlers, 2) discuss common features among these deaths and the circumstances surrounding them as revealed by the death investigation, and 3) explore various considerations for confirming drug exposures and determining manner of death in similar cases. **METHODS:** The case files of the Utah Office of the Medical Examiner for the last five years were reviewed for fetal, infant, and toddler deaths caused by or related to drug toxicity, and a literature search was conducted to identify potential additions to standard autopsy practices to confirm drug concentrations and chronicity of exposure in this population. **RESULTS:** Of the 396 cases from 2013 to the present for ages zero to three years, six cases with drug toxicity listed as a cause of death were identified. No fetal cases were identified where drug toxicity led to or contributed to demise. In this series, two decedents were infants less than one year old; four were toddlers one to three years old. In five of these

cases, drug toxicity was the direct cause of death, while one was determined to be positional asphyxia with drug intoxication as a contributory condition. Four deaths were attributed to medications prescribed to another household member; two were attributed to illicit drugs. Four deaths were due to opiates/opioids (methadone, oxycodone, and heroin), one to trazodone, and one to methamphetamine. Three children had been treated for neonatal abstinence syndrome at birth. Criminal charges were filed against guardians in four of the six cases. Homicide was listed as the manner of death in one case, accident in another, and manner of death was not determined in the remaining four cases.

CONCLUSION: These six cases represent an uncommon but preventable cause of early childhood death. Recognition of the commonalities shared by these cases, including physical evidence and circumstantial information, may help to classify manner of death appropriately and potentially identify young children at increased risk for drug intoxication and premature death. Finally, testing of additional specimens such as meconium, cord tissue, cut hair and/or nails, liver tissue, and peripheral blood was cited as potentially providing additional useful information in cases such as these.

P19 Pregnancy-Related Mortality at Montefiore Medical Center

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Objective: To relate pregnancy-related mortality estimates and describe the characteristics and causes of maternal death at Montefiore Medical Center.

Methods: We collected data regarding pregnancy-related deaths at Montefiore Medical Center from 2000 to 2017 utilizing Clinical Looking Glass, a clinical database navigational tool. The most recent national pregnancy mortality ratio data reported by the Centers for Disease Control is for the years 2011-2013. Pregnancy related mortality rates at Montefiore were also examined during this same time period for comparison to national rates.

Results: A pregnancy-related death is defined as the death of a woman while pregnant or within 1 year of the end of pregnancy. Historically, the pregnancy-related mortality ratio from 2000 to 2017 at Montefiore has been variable, starting at 8.2 deaths per 100,000 live births in 2000 with peaks of 37.1 in 2006 and 38.2 in 2015. However, it subsequently declined to 12.9 in 2016 and 16.2 in 2017. The racial-ethnic disparities were not significant with Black women demonstrating a mortality ratio of 1.1 (0.6, 2.0) compared to White women and Hispanic women demonstrating a 0.8 (0.4, 1.6) mortality ratio compared to White women.

The 2011, 2012 and 2013 pregnancy-related mortality ratios at Montefiore were 24.4, 13.2 and 32.9, respectively. The national rates for the same years were 17.8, 15.9 and 17.3. Forty-four percent of all pregnancy-related deaths during the same period were among Hispanic women, 38% among Black women and 6% among White women. While the percentage for Black women is similar to the national average of 37.9%, the national percentage for Hispanic women is lower at 14.9% and the national percentage for White women is higher at 40%. The average age at death for the 2011-2013 Montefiore cohort was 33.1 years (SD 37.2, 28.9) and 93% had a low socioeconomic status. The most common cause of pregnancy related death was cardiac arrest (12.5%). Other causes included acute respiratory failure (3.8%) and cerebral embolism with cerebral infarction (3.8%). The most common comorbidity was diabetes without chronic complications (12.5%). Other comorbidities, all at 3.8%, included diabetes with chronic complications, congestive heart failure, chronic pulmonary disease, mild liver disease, renal disease, malignancy and AIDS/HIV.

Conclusion: The 2011 and 2013 pregnancy-related mortality ratio at Montefiore is higher than the most recently published national levels while the 2012 ratio is lower.

P20 When Cultures Fail: Postmortem Decoy Receptor 3 (DcR3) as a Marker of Antemortem Sepsis

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Background:

Many different proteins, hormones, and metabolites are produced by the body during times of stress. These compounds, once released into the bloodstream, can be used as markers for disease. Decoy receptor 3 (DcR3), a member of the tumor necrosis factor receptor superfamily, has shown utility as a reliable surrogate marker. Levels of DcR3 in the serum increase and remain elevated in several disease states including cancer, autoimmune disease, and sepsis. In inflammatory conditions, DcR3 is upregulated in inflammatory cells to suppress exponential immune propagation. The use of DcR3 as an indication of sepsis has been used in the antemortem setting, but its use in the postmortem setting is unknown. The purpose of this study is to evaluate postmortem DcR3 as a marker of antemortem sepsis.

Methods:

A retrospective investigation was performed of the electronic pathology database PowerPath (Sunquest Informational Systems) to identify patients between 2014-2017 whose primary cause of death fell into one of four cohorts (control, widely metastatic cancer, culture positive sepsis, and suspected culture negative sepsis). Blood samples were collected at the time of autopsy and stored at -20°C in sodium fluoride or serum separator vacutainers. Serum was separated and tested by a commercially available ELISA to quantify DcR3 levels.

Results:

Forty-seven patient samples were obtained (control n=15, widely metastatic cancer n=13, culture positive n=14, culture negative n=5) and tested. First, tests were performed to indicate that DcR3 was present in postmortem serum samples and not rapidly degraded in the postmortem period. Second, DcR3 levels were quantified across the cohorts showing increased levels in cancer, culture positive, and culture negative cohorts compared to controls. When compared to each other, patients with widely metastatic cancer had similar values to those with sepsis. Finally, time of specimen collection after death appeared to play a role in DcR3 detection and quantification.

Discussion/Conclusion:

The use of emergent antibiotics and the difficulties of culture collection/growth make the diagnosis of antemortem sepsis in the postmortem setting problematic. Investigation of surrogate markers, such as DcR3, as an indicator of sepsis, in conjunction with postmortem examination, provide forensic pathologists with a more reliable and reproducible indicator of underlying sepsis, which in turn, could lead to more accurate and timely postmortem reporting.

P21 Look What The Storm Blew In: Partial Mandible Recovered in Galveston, Texas

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An electrician was working in a crawlspace under a house that had been flooded during Hurricane Ike. He found a partial mandible covered in mud, and the Galveston County Medical Examiner was called to the scene. No further bones were evident at the scene. After photos were taken, the partial mandible was brought to the medical examiner's office for further examination by the associated forensic anthropologist. No flesh

remained on the bone, and only the body remained with irregular breaks at the angle of the mandible. Areas of bone no longer appeared porous and resembled rock. The front teeth (lateral and central incisors) were absent, and the remaining teeth exhibited extreme loss of enamel. The remaining teeth show extensive wear, exposing the underlying dentin; contemporary peoples rarely allow their teeth to deteriorate to this condition. The fairly even wear suggests a grain-based culture; small pieces of stones that remain behind following the grain grinding cause such deterioration of the dentition. Permineralization is present in the bone of the specimen, indicating a significant time between death and discovery. Bone that is buried in silicon dioxide can begin permineralization within 50 years (and thus be of forensic significance); however, the other characteristics suggest the specimen is much older. The color of the bone suggests the individual was buried directly within soil containing clay (seen in deeper soil). The fractured nature suggested archeological material as opposed to forensic. Although a small piece, the elliptical shape of the dental arcade and blunt chin suggest a native indigenous individual. Attempts at carbon dating are currently pending. A local curator was contacted for storage recommendations and ethics concerns. A reproduction was created using a 3D scanner and printer. Follow up will include repatriation of native remains if possible. After examination, the office's anthropologist was able to conclude that this was archaeological in nature and not a recent case requiring further forensic work up. This case illustrates the importance of retaining an anthropologist's services in forensic offices—without her expertise, the case would most likely not have been concluded so quickly, thus laying to rest the fears of island residents, hurricane survivors, who were concerned a recent homicide victim had been unearthed.

P22 Drowning Deaths in the State of Rhode Island

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Drowning is a significant public health issue. According to the World Health Organization (WHO) report, drowning is the third leading cause of unintentional injury death globally. In the United States, an average of 3,868 lives per year are lost to drowning. Despite being the smallest state of the union, Rhode Island is notable for its 400-mile shoreline, rightfully earning the state its nickname "the Ocean State". Access to water is abundant here which allows for drowning related deaths to be seen among a wide age range of individuals by the statewide Medical Examiner system.

We examined all deaths due to drowning in Rhode Island over a 10-year period, from 2007 to 2017. Information was extracted from the RI Office of the Medical Examiners (OSME) electronic case database system used by the state's Office of the Medical Examiners using the search term "drowning". A total of 194 cases were included (n=194). Decedents ranged in age from 10 months to 96 years. Males comprised 75.2% (n=146) of drowning victims while females constituted a much smaller segment at 24.7% (n=46). The overwhelming majority of drowning deaths were due to accidents (69.6%; n=135). Interestingly, suicides by drowning contributed a sizable portion at 26.2% (n=51). Even more intriguing is the fact that more than half of these suicides were due to jumping off a bridge (54.9%; n=28). One death was due to a cardiovascular event during diving and was deemed natural (0.5%; n=1). Seven deaths were due to undetermined manner (3.6%; n=7). No drownings were due to homicides during the specified period. Of the 20 drownings (10.3% of all cases) in the pediatric age group, victims ranged in age from 10 months to 17 years. Males again were disproportionately affected (80%; n=16). In the same age group, there were seven deaths due to drowning in a swimming pool (35%; n=7) with decedents ranging in age from 16 months to 15

years. 71.4% (n=5) of the pediatric swimming pool drownings occurred in white children while 14.3% (n=1, respectively) in an African American and a Hispanic child. This may be due to a limited number of cases in this age group and may be reflective of the state's racial makeup. Safeguards may be put in place in light of these data in an effort to reduce drowning deaths and perhaps even prevent a number of suicides.

P23 Cerebral Vascular Thrombosis associated with Ulcerative Colitis

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Crohn's disease and ulcerative colitis, the two major forms of inflammatory bowel disease (IBD), are associated with numerous intestinal and extra-intestinal complications. Among these includes an increased risk for venous thrombotic events (VTE), which may lead to sudden death. The most common sites for thromboses are the lower extremities and pulmonary vasculature; less frequently involved sites include the cerebrovascular system, portal vein, and mesenteric veins.

We report the case of a 23-year-old male with past medical history of ulcerative colitis and primary sclerosing cholangitis found deceased at home after not reporting to class for 3 days. The decedent was found supine in bed with no signs of trauma or drug use. The decedent's mother stated he complained of fever and "the worst diarrhea" he had ever had three days prior to his discovery. Additionally, he had recently been diagnosed with *Clostridium difficile* colitis following a hospitalization for cellulitis. The decedent was originally diagnosed with ulcerative colitis and primary sclerosing cholangitis five years before, was compliant with his medications, and had not had surgery related to his ulcerative colitis. At autopsy, the brain was markedly edematous with diffuse subarachnoid hemorrhage over the left cerebral frontal, temporal, and parietal cortices. The vessels at the base of the brain were unremarkable and there was no significant hemorrhage over the inferior surfaces. On sectioning, clotted blood was identified in the left frontal lobe and lateral ventricles. Basal ganglia, thalami, and hippocampi were unremarkable. Microscopically, the left cerebral hemisphere showed extensive intraparenchymal hemorrhage, necrosis, and numerous thrombosed leptomeningeal vessels. Sections of the transverse and descending colon showed chronic mucosal inflammation with occasional crypt abscesses. The cause of death was determined to be a cerebral hemorrhagic infarct caused by cerebral venous thrombosis due to ulcerative colitis and primary sclerosing cholangitis.

Cerebral vein and sinus thrombosis (CVT) represents approximately 1% of all strokes and is a known rare complication associated with IBD. Symptoms of CVT are highly variable and may manifest as headache, focal neurological deficits, seizure, or encephalopathy. In addition to acquired hypercoagulability risk factors patients develop during active disease flares (ie. inflammation, dehydration, vitamin deficiencies/hyperhomocysteinemia, etc.), studies suggest that IBD itself represents an independent risk factor for thrombosis. It is important for the forensic pathologist to consider thrombotic complications, particularly those in the cerebral venous system, as potential manifestations of known or undiagnosed inflammatory bowel disease.

P24 An Examination of Deaths at YMCAs from 2014-2017

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For more than a hundred years, YMCAs around the country have provided significant educational, recreational, and charitable opportunities. In the mid-twentieth century, they were well known as places of temporary residence. Although their residential programs are much diminished in

recent years, many YMCA centers still have functioning residential facilities, catering to those in need of transitional housing. This high risk population has a unique set of challenges and vulnerabilities. An examination of the circumstances of those who have died while living at a YMCA residential facility provides an opportunity to understand those who are most at risk and what preventive measures may be taken in the future. A review of the Cook County Medical Examiner's Office database was performed over a three year period from August 2014-August 2017 to identify deaths that took place at YMCA residential facilities in the Chicagoland area. The cases were reviewed to assess prevalence and identify similar features.

A total of 27 deaths occurred at YMCA residential facilities during the study period. These deaths occurred across nine different facilities. Nine deaths took place at the Lawson House YMCA near the Magnificent Mile. Four deaths took place at Lakeview YMCA. One or two deaths took place at the remaining seven facilities, with three deaths taking place at an unknown facility. Of the 27 deaths, 21 were male and 6 were female. 25 were residents of the YMCA facility, and 2 were nonresidents. 15 of the decedents were white, and 12 were black. 19 of the deaths were classified as natural, 5 deaths were classified as accidental, and 3 deaths were classified as suicide. The age range of the decedents was 28-82 years, with the average age being 57 years. At least 10 decedents had known prior health conditions that likely directly contributed to their deaths. 7 decedents were found in a state of decomposition; of these, 5 had no next of kin.

Examination of the causes of deaths occurring in transitional housing such as residential YMCA facilities can help shed light on the challenges faced by at-risk populations, particularly those people who are socially isolated or need treatment for a chronic medical condition.

P25 Death from Constipation: The Abdominal Compartment Syndrome

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Constipation is a common pediatric complaint with organic causes identified in only 5% of cases. Chronic severe constipation can lead to colonic dilatation and encopresis as the colon adapts to retained hardened stools. As the colon occupies an increasing amount of space within the abdominal compartment, intra-abdominal pressure rises. Rarely, constipation has been described as a cause of abdominal compartment syndrome (ACS). ACS is defined as organ dysfunction resulting from persistent intra-abdominal hypertension. In children, ACS may occur at pressures greater than 10 mm Hg. If left untreated, multi-organ failure commences. Increased pressure compresses vessels, decreasing organ perfusion. Elevation of the diaphragm to increase abdominal space compresses the lungs and causes respiratory failure. Cardiac failure ensues from the combined effects of increased systemic vascular resistance and decreased preload. Here we describe two pediatric deaths from probable ACS associated with chronic constipation.

Case 1: An 8 year-old male with a history of a high-starch diet and irritable bowel syndrome requiring regular enemas presented with complaints of nausea, appetite loss, and a firm and distended abdomen. An enema was administered with minimal improvement. After five days, he began to have heavy diarrhea with incontinence. He went to bed with complaints of subjective fever and was found unresponsive by a relative forty minutes later. At autopsy, the abdomen was distended and firm. The large intestine was dusky and diffusely dilated, most prominently in the sigmoid colon. Hard stool was present throughout the entire colonic lumen, with some admixed loose stool in the

rectosigmoid. No masses, necrosis, or perforations were present. Microscopic sections demonstrated normal ganglion cells throughout the colon.

Case 2: A 14 year-old male with a history of irritable bowel syndrome presented with one day of abdominal pain. Throughout the day, he had numerous episodes of diarrhea and one episode of emesis. The next morning, he was found unresponsive on the bathroom floor surrounded by feces. At autopsy, the abdomen was distended. The colon was dusky and dilated, most prominently in the distal colon. Two large fecaliths, measuring 8.5 cm and 19 cm were present in the rectosigmoid colon. No necrosis, masses, or perforations were identified. Ganglion cells were present in microscopic sections of the rectum.

Constipation is a common condition in the young, which may rarely result in death. Abdominal compartment syndrome, which has an estimated mortality rate of 40-60% in children, should be considered among its possible complications.

P26 Postmortem FilmArray Respiratory Pathogen Panel Testing in Pediatric Decedents

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Respiratory infections are a common cause of illness in pediatric patients, and on rare occasions lead to significant pathology and occasionally to death. These cases generally fall under the jurisdiction of the medical examiner. Historically, options for identification of specific viral pathogens were limited to immunohistochemical analysis or viral culture. Newer techniques involving polymerase chain reaction (PCR) arrays are now available, although there is limited data about their utility in the pediatric postmortem setting. This retrospective study looked at the use of this technique in upper respiratory samples from 151 pediatric cases over a three-year period, not selected for antemortem history of respiratory symptoms or illness. Sixty-three percent (63%) of these decedents had a positive PCR result, most commonly human rhinovirus/enterovirus. Additional common pathogens detected included adenovirus, parainfluenza virus 3, respiratory syncytial virus (RSV) and human metapneumovirus. The pathogen detected by PCR was identified as the cause of death or a contributory factor to death in 9.3 percent of decedents, with RSV, parainfluenza viruses, and human metapneumovirus overrepresented in this category. In the subset of 28 cases (19% of the total) with a reported history of respiratory symptoms or illness, the percentage of positive results was higher (86%) as was the likelihood that death resulted from the identified pathogen (36%). This study provides further evidence of the utility of respiratory pathogen PCR testing in a postmortem setting.

P27 A Case of Traditional Indian Medicine Causing Combined Mercury, Arsenic, and Lead Heavy Metal Toxicity

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Here we describe a case of accidental heavy metal toxicity secondary to use of traditional Indian medicines. Some traditional Indian medicinal preparations are known to contain heavy metals including lead, mercury, and arsenic. Traditional therapies, Indian and otherwise, are widely available and unregulated in the United States. The present case involves

a 49 year old yoga instructor with recent history of declining health who died at home. A scene investigation led to the discovery of multiple "herbal medicines, liquids, and colorful powders" at his home. Discussions with a family member revealed that the decedent practiced the Siddha traditional Indian system of medicine and would self-administer these preparations. At autopsy, the decedent was found to have pulmonary edema and congestion (right lung, 1,391 grams; left lung, 1,419 grams), marked lower extremity skin changes, and an overall chronically ill appearance. Microscopically there was evidence of pulmonary hemorrhage and congestion, centrilobular hemorrhage and necrosis of the liver, and hyperkeratosis, parakeratosis, and extensive acute and chronic inflammation of the skin of the lower legs. Routine toxicology testing was performed and showed no evidence of drugs or alcohol. Additional testing revealed the patient had a mixed toxicity of mercury, arsenic, and lead at significantly elevated concentrations in the peripheral blood (280 mcg/L, 120 mcg/L and 79 mcg/dL, respectively). Elevated concentrations of mercury, arsenic, and lead were also detected in the urine. The cause of death was determined to be combined heavy metal (lead, mercury, and arsenic) toxicity and the manner of death was accident. Heavy metal toxicity is an uncommon cause of death in the United States, and is primarily related to occupational exposures. These three metals are also known potential contaminants of certain traditional Indian medicines, raising a public health concern for those who take preparations related to this type of medicine.

P28 Fact or Fiction? Dispelling Suicide Myths

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Suicide is a tragic act and a taboo topic of conversation. In a relative vacuum of discussion, misconceptions and myths surrounding suicide have evolved. Current myths about suicide in the southern United States are unclear. After obtaining approval from the Emory Institutional Review board, we created a survey to examine beliefs about suicide held by normal adult volunteers in the greater Atlanta metro area. Upon recruiting 500 volunteers, we will compare local beliefs about suicide to data obtained through a 10-year retrospective review of all suicide cases in Fulton County, Georgia.

A review of all suicide cases from 2008 through 2017 was performed (N = 1058). All data were extracted from the Fulton County Medical Examiner's Office (FCMEO) electronic case record system, HOMER. Variables examined include age, race, sex, method of suicide, date of suicide, general location of suicide, and the presence or absence of a note, psychiatric diagnosis, family history of suicide, and known stressor. Our survey consists of 17 questions based on conversations we have had at the FCMEO with the next of kin of suicide victims. We have heard that women usually overdose on medication and that black people do not hang themselves. To investigate these stereotypes, we ask, "What is the most common method of suicide?" overall, for men and women, and for white, black, and Asian people. We have heard that people who complete suicide have a family history of suicide or a psychiatric diagnosis, and we ask volunteers if this is true. We have heard that people usually complete suicide around holidays or during the winter, and we ask volunteers if these correlations are real. We have heard that suicides do not occur outside; we ask volunteers where suicide is most likely to occur. We have heard that children do not complete suicide. To address this, we ask volunteers to tell us the youngest age at which a person may be considered a suicide and the average age at which a person completes suicide. We have heard that most people who complete suicide leave a note; we ask volunteers to estimate this percentage. We also investigate

what people believe to be the most common stressor reported in cases of suicide.

Preliminary results suggest that community beliefs about suicide do not reflect current data regarding suicide in Fulton County.

P29 Compression Asphyxia Associated with Community Donation Bins: A Description of Multiple Fatal Cases in British Columbia.

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Community donation bins have become more common in the city setting over the past 10 years. Many non-profit organizations use these sturdy metal enclosures for unobserved collection of various donated items such as clothing, books and unwanted household items. Although the donated items are generally of low individual value, these donation bins may become a target of individuals having low socio-economic status seeking desired items for personal use or resale.

One means of deterring theft from donation bins has been the design of a tamper-resistant door mechanism. Many bins are designed such that the donated items are placed into a metal door trough, with the items being deposited into the bin once the door handle is lifted approximately 90 degrees. Although the design of these tamper-resistant bins is generally an effective theft deterrent, problems can arise if an individual seeks to access the contents of the bin via the tamper-resistant door.

Compression (aka. mechanical, crush, traumatic) asphyxia refers to a form of suffocation where pulmonary respiration is prevented by external pressure on the body (e.g. torso or neck). This may take the form of a heavy weight compressing the torso or neck; or wedging of the body within a narrow space.

We have observed three (3) Coroner-investigated deaths (two males, one female) within a one-year period (2015-2016) wherein each decedent became trapped in the entry-point of a community donation bin; dying from compression asphyxia due to the door mechanism pressing upon the upper body and/or neck of the individual.

The decedents in two of the cases were found caught within the donation bins and pronounced dead at the scene. Autopsies in each case showed evidence of soft tissue injuries to the upper body and neck.

In the third case, a bystander observed the decedent reaching into the narrow bin opening within an hour of the individual losing consciousness. This decedent was promptly extricated and resuscitation efforts in hospital were ultimately unsuccessful. The individual died in hospital approximately 24 hours later with a final diagnosis of anoxic brain injury secondary to compression asphyxia of the neck structures. No autopsy was performed.

It is our contention that donation bin-associated deaths may be a preventable phenomenon, potentially due to a change in design of these devices, or where they are located. The circumstances resulting in this novel cause of death have not been previously described in the medical or forensic literature.

P30 Calling an Audible: Continuity of Medicolegal Operations During a Superbowl

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The superbowl is an annual occurrence, and one of the largest events in the world. Year after year, American cities host this event on the grandest of stages for the entire world to see. Behind the scenes, months of planning go into every detail. As a SEAR 1 event, the super bowl is on par with presidential inaugurations when it comes to public safety planning.

From a medical examiner's viewpoint, the influx of fans and media from all

over the world represent potential challenges if a death occurs. The complexities of hosting a 10 day festival in a dense, urban downtown area presented a host of other unprecedented challenges for the Hennepin County Medical Examiner's Office located adjacent to the USBANK stadium. The NFL does not offer host cities, much less morgues, a playbook for continuity of operations when security perimeters are expanded, road closures are in effect for weeks and the main ticketholder entry point is in your backyard. For sixteen months, the Hennepin County Medical Examiner planned and prepared for every conceivable impact to our medicolegal operations, including a mass fatality incident. The results involved transitioning of medicolegal operations, including investigations, morgue and autopsy services to offsite locations for 8 days, while maintaining NAME standards. The problem solving and decision making served to inform on-going disaster planning, and evaluated the efficacy of existing continuity of operations and disaster plans. The impacts of major events to daily medical examiner operations are often not considered, and this should serve as a guidepost to medical examiner's impacted by large scale events within their jurisdiction.

P31 Death in Custody: a Nine-Year Review of Custodial Deaths in Allegheny County, PA

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Introduction

Death in custody is a topic of growing prominence in forensic science, with what seems to be an increase in non-natural deaths. If at-risk populations can be identified, protocols might be implemented to help prevent such deaths.

Materials and Methods

A retrospective analysis of cases from the Allegheny County Medical Examiner's Office from 2008 to 2016 was performed. Cases were divided into "jail deaths" regarding incarcerated prisoners, and "deaths in pursuit/custody" regarding individuals in pursuit by officers, or in custody but not yet convicted. The findings were compared with the 2016 average daily census of the Allegheny County Jail population, and county cause of death statistics.

Results

In a county of 1.2 million people, 51.7% were female; 80.5% were white, followed by 13.4% black. Of 176 total suicides, 106 were white males (60%). By comparison, the county jail population was 87% male, 13% female. Black males were 54%, white males 32%; black females were 5% and white females 7%.

There were 168 total jail or pursuit/custody deaths between 2008 and 2016, 80 of which were non-natural. Of these, 69 were male (86%), 11 female (14%); 43 were white (54%), 35 were black (44%).

Among the 102 jail deaths, suicide was the most common non-natural manner. The median age of suicides was 43 years; the majority were hangings. Males outnumbered females 3.8:1, with white males most heavily represented.

Among the 66 pursuit/custody deaths, the leading manner was homicide, followed closely by accidental. The majority of homicides were caused by firearms involving a police officer, with at least one uncontrollable case of excited delirium. These incidents averaged one per year with peaks in 2009 and 2010; all were deemed justified. The median age of homicide cases was 29 years. The accidental deaths were primarily attributed to blunt force trauma, followed by drug-related. Males outnumbered females 8.3:1, with black males most heavily represented among accidents and homicides.

Discussion

Non-natural jail deaths outnumbered those in pursuit/custody, and were primarily suicides by hanging. Victims were usually white males,

constituting 82% of jail suicides, but only 32% of the jail population. This rate is elevated when compared to overall county data. Pursuit/custody deaths are evenly split between homicides and accidents, with black males most frequently involved.

Mental health programs for incarcerated individuals, targeting middle-aged males, could reduce the number of jail suicides. Officer-involved pursuit/custody deaths appear to be on the decline, which is encouraging.

P32 Compressed Air Tank Explosion at Marijuana Factory: A Case Study

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As marijuana becomes more accepted and progressively legalized in the United States, legalized growing operations to produce either medical or recreational marijuana are starting to appear. Compressed carbon dioxide (CO₂) is used in these locations to supplement the growth of marijuana while compressed nitrogen (N₂) is used in packaging to preserve the harvested plant. We present a case of a fatality caused by an explosion of a compressed air tank at a growing operation. The decedent was left alone by a co-worker in a room with approximately 50 total compressed air tanks with both N₂ and CO₂. His coworker heard an explosion occur. Bomb squad personnel stated that a mechanical explosion had occurred caused by two or more tanks suddenly bursting. A detailed scene investigation and autopsy was performed with a review of relevant literature/standards. The cause of death was determined to be multiple injuries sustained during a compressed air tank explosion. These include laceration with underlying tissue destruction of the right side of his head with the complete dismemberment of the right arm and left leg and partial dismemberment of the right leg. A large piece of metal shrapnel was embedded within the thoracic cavity, bisecting the heart. Small pieces of metallic wire shrapnel were embedded throughout his skin. In addition, skin and soft tissue around the groin had a green discoloration, consistent with burns covering approximately 2% of the total body surface area. The manner of death was an accident. Deaths caused by explosions are rarely encountered; improper handling of compressed air tanks remains one potential source of this type of death. Per OSHA regulations, these tanks must be stored upright in a secured manner that prevents them from striking each other. This is generally done with some kind of framing and a chain or strap. The air regulator should be covered when the tank is not in use to prevent damage. Review of the scene indicated that many of these safety regulations were not being followed, and likely precipitated the explosion that resulted in death. The interesting finding of tissue burns can be explained using Charles's Law, which states that volume and temperature are related. As the gas expands, it needs a requisite amount of heat energy to do so, and it absorbs this energy from its surrounding environment. In the case of the decedent, this resulted in freeze burns.

P33 Cyclopropyl Fentanyl: A New Designer Opioid in Metro Detroit

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Since 2013, the production of illegal synthetic opioids including fentanyl analogs has increased to unprecedented levels. Analogs are created to circumvent legal prosecution and many are undetectable by conventional toxicology tests. Cyclopropylfentanyl (CPF) is created by replacing the propionyl moiety of fentanyl with a cyclopropyl group and has started to increase in popularity since late 2017. While fentanyl is reported to be 50-100 times more potent than morphine, the potency of CPF is not known.

The first reported appearance of CPF occurred in June 2017 in Georgia. To date, more than 90 cases of intoxication have been reported, with at least 60 fatalities; 29 in Oregon, 22 in Sweden, 5 in Georgia, 3 in Pennsylvania, and an unidentified number in Indiana, Colorado and New Jersey, all involving CPF mixed with other narcotics. Between August and December 2017, a total of 8 overdose deaths associated with CPF were reported in Wayne County, Michigan. Two deaths occurred in August, one in September, three in November, and two in December. The decedents consisted of 7 men and 1 woman with an age range of 23-63 years (mean 47.4 years). Four individuals were white, and four were African American. Cyclopropylfentanyl was detected by LC/MS accurate mass screening (time-of-flight) and confirmed and quantitated by LC-MS/MS. The mean concentration of CPF in blood was 19.5 ng/mL, 6.23 ng/mL in vitreous fluid, and 174 ng/g in the liver. The average urine concentration in 3 cases was 31.3 ng/mL, with another three cases reported as >25 ng/mL. Polysubstance abuse was noted in all but one case. Six of the patients screened positive for other opiates. All but 2 individuals were found to have consumed stimulants, depressants and/or illicit substances such as cocaine (5), and cannabinoids (4). Benzodiazepines (2), and diphenhydramine (1) were also detected. Our abstract is the first report of cyclopropyl fentanyl distribution in autopsy specimens and its relationship with other commonly abused drugs.

P34 Outcome of Cases Referred as Possible Drug Overdose, Demographics and Comorbidity: A Study From Rural Eastern North Carolina

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Modern society is experiencing a significant increase in abuse of illicit drugs and prescription-type opioids. The demographic of drug users varies across levels of urbanization within the country(1). A recent study showed that non-metropolitan areas have a higher drug overdose death rate than metropolitan areas (2). Forensic offices around the country are experiencing increased numbers of cases referred as suspected drug-related deaths. The bases of the referrals range from a the history of drug abuse with scene findings, to extensive medication use, to mental illness, to young age, or just lack of reasonable explanation of death and advanced decomposition. The aim of our study is to examine how many of our current caseload referred as suspected drug-related deaths actually are drug-related as well as to assess the comorbidities of victims. A convenience sample of 72 completed autopsy cases referred as possible drug-related deaths was examined for outcome (cause of death) and presence or absence of comorbidities. Outcomes were defined as: drug toxicity deaths, drug(s) as a contributing factor, natural disease or trauma.

We found 40 of the cases (55%) were drug(s) toxicity; 7 (10%) had drug as a contributing factor; 25 (35%) were natural or traumatic deaths. The mean age was 44 years (median 43). Our data show significant comorbidity(-ies) in all groups. Drug deaths -- 38% and 30% with one and more than one comorbidity respectively, drugs contributed 38% and 43%, and no drugs 16% and 84% with one and more than one comorbidity respectively. Comorbidities include hypertension, atherosclerosis, emphysema, cirrhosis, diabetes mellitus, seizures, and mental disorders. Other findings include pulmonary emboli, acute pancreatitis, gastric bleeding, dilated cardiomyopathy, and arrhythmogenic right ventricular cardiomyopathy.

Numerous national and local surveys and studies of demographic of drug abuse have been presented. To our knowledge, there is no systematic study of outcomes of cases referred as suspected overdose. Our data showed that only 65% cases referred as "possible overdose" were

diagnosed as drug related death and more than 1/3 were not drug-related and had required additional information beyond toxicology results. In this study a typical drug victim is in the early forties and has significant comorbidities. Gross autopsy and toxicology studies alone may not be sufficient to provide a cause of death. A detailed history, medical records and complete autopsy, including histology, and possibly culture and biochemical studies are needed for accurate death investigation.

**P35 Crime Scene Analysis Using DNA Testing of Dog Feces--
A Case Report**

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Introduction

Studies have demonstrated the efficacy of DNA testing using bodily fluids such as blood, sweat, semen, and saliva to aid in crime scene investigations. In this report, we present a triple homicide in which a suspect was linked to the crime scene using canine fecal DNA found at the crime scene and on the sole of the suspect's shoe. This case illustrates how stool-sample DNA testing may help to elucidate critical evidence in homicide investigations.

Case Presentation

A construction worker arrived at a pole-barn on an upscale property to find his three male co-workers dead – each face down on the floor with their wrists duct-taped behind their backs and appearing to have been shot in the head “execution-style”. The homeowners had been on vacation with the house secured by alarm. Evidence from the crime scene was inconclusive. However, detectives also discovered a fresh pile of dog feces with a shoe print on a sidewalk. A call was then received from a teenage female who had “freaked out” and revealed her involvement after hearing about the incident at work. Questioning of the teen provided law enforcement with the names and location of four suspects, one of whom was wearing a shoe with residual feces. Samples from the shoe and crime scene were tested for DNA, with results which were identical for 11 canine-specific microsatellite DNA markers. Statistical analysis concluded that 1 in 1.16 billion dogs would match the DNA profile of both samples. Each of the 4 suspects was convicted.

Discussion

In this case, DNA testing of dog feces provided invaluable information which linked a suspect to a crime and eventually led to multiple convictions. In addition to demonstrating the utility of fecal samples in forensic investigations, this case emphasizes the need for law enforcement officials and forensic pathologists to adopt forward-thinking strategies. These include thorough examination of all details of a crime scene, even those for which the value is not immediately apparent, and promptly conducting necessary tests or retaining evidence for future testing.

**P36 Multiple Suicidal Gunshot Wounds without Immediate
Incapacitation – Autopsy Findings and Challenges**

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BACKGROUND/INTRODUCTION:

Multiple self-inflicted gunshot wounds are rare. The initial investigation of the crime scene could arouse suspicions of homicide or participation by another individual. Evaluating an individual's capacity to act following each wound is essential for determining the manner of death and reconstructing the timeline of events.

CASES:

This study reports on a series of cases of multiple self-inflicted gunshot wounds. The number of gunshot wounds per case ranges from two to four with the majority of the cases having two. The types of firearms used include handguns, shotguns, and rifles. Injury location patterns include two injuries to the head, two intraoral injuries, injuries to both the chin and head, and injuries to both the chest and head. The majority of cases were unwitnessed, but some were witnessed, and some involved law enforcement.

DISCUSSION/CONCLUSION:

An individual's ability to act following a particular gunshot is frequently raised in court, especially in cases with law enforcement involvement. These cases serve to remind investigators of obtaining pertinent crime scene information as part of an adequate death investigation. Forensic pathologists are reminded that proper dissection techniques, detailed descriptions of injuries, and photographic documentation are essential when confronted with such cases.

**P37 Microscopic Pulmonary Tumor Emboli: Unusual
Presentation of Occult Cervical Carcinoma. Two Case Reports and
Review of the Literature**

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Cor pulmonale (right heart failure) due to microscopic pulmonary tumor emboli (MPTE) can arise from a variety of malignancies including breast, lung and liver, and carries significant morbidity and mortality. Tumor cell aggregates spread hematogenously to the lungs and occlude small pulmonary vessels leading to pulmonary hypertension through either a mechanical process or by inducing vascular remodeling as a downstream result of interactions between the embolus and the vessel wall. Its presentation includes unexplained dyspnea, hypoxemia, tachycardia, pulmonary hypertension, right heart failure, and in some cases sudden death. The symptoms may suggest the more common entity of pulmonary thromboembolism, particularly in the setting of previously known metastatic cancer, however computed tomography scans may appear normal and ventilation-perfusion scans which are the preferable diagnostic modality are not always ordered. Furthermore, anticoagulation, which is the appropriate therapy for pulmonary thromboemboli, is contraindicated and can even prove fatal in microscopic pulmonary tumor emboli due to their potential for hemorrhage. In most cases of MPTE, the presentation reflects metastasis of an already known and advanced tumor, but, in rare cases, it may be the primary manifestation of an occult malignancy. We present here two unique cases of MPTE in women with occult cervical cancer. In both cases, the malignancy was discovered and diagnosed at autopsy. Microscopic pulmonary tumor emboli, as the term implies, are often not grossly evident and the diagnosis requires a high index of suspicion in the forensic setting. MPTE can be easily overlooked, and therefore forensic pathologists and other death investigators should be aware of it and trained to at least consider the possibility in appropriate situations. Thorough microscopic examination of apparently normal tissues may be necessary, particularly in cases of unexplained right heart failure and sudden death, even if the decedent has few or no identifiable risk factors for cancer. Though time consuming, histologic examination of tissues is essential to the determination of the accurate cause of death.

P38 Ehlers-Danlos Syndrome IV: A Confusing Presentation and Question of Manner of Death

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Ehlers-Danlos Syndrome (EDS) is a disorder of fibrillar collagen metabolism with specific defects in the collagen biosynthetic pathway. Currently, EDS is divided into 13 subtypes. Ehlers-Danlos Syndrome type IV, the vascular type, is an autosomal dominant disorder that results from mutations in the gene for type III procollagen (COL3A1). The clinical diagnosis of Ehlers-Danlos Syndrome type IV rests on the finding of at least two of four diagnostic criteria (thin, translucent skin; arterial, intestinal, or uterine rupture; easy bruising; and a characteristic facial appearance), but laboratory studies are necessary for confirmation. The median life expectancy for EDS type IV is 50 years. We present the case of a 31-year-old pharmacist who was found dead in a locked bathroom of a local bar. Blood was on the floor due to a forehead laceration. No other injuries were noted. The only medical history provided was two past colon surgeries. At autopsy, the only injury she had was to the head. The forehead laceration was over an intact skull. Upon removal of the calvarium, massive subarachnoid hemorrhage was identified with predominance over the base of the brain and extension down the spinal cord. 50mL of blood were in the posterior cranial fossa. The circle of Willis was intact, no arteriovenous malformations were present, and sections through the cerebrum and cerebellum were unremarkable. Anterior and posterior neck dissections revealed a laceration of the right vertebral artery. Examination of the gastrointestinal tract showed previous resection of the sigmoid colon. The liver and spleen had large areas of fibrosis. Upon sectioning, the lung parenchyma was friable. The autopsy gross and microscopic findings were challenging to correlate. Blunt force trauma with hyperextension of the neck was determined to be how the vertebral artery was lacerated, but this seemed unusual for such a young woman with only a 1.0 inch forehead laceration. The scene was suspicious for foul play. Contact with the decedent's mother revealed that she had EDS IV. With this information, we were able to develop a clinicopathologic correlation and accurately rule the manner of death as accident.

P39 Sudden Death With a Left Ventricular Assist Device (LVAD): Forensic Considerations

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We report a case of a 72 year-old man with a history of end-stage ischemic heart disease and prior implantation of a left ventricular assist device (LVAD), who was found unresponsive in a hotel room. He had been staying at the hotel while undergoing a routine follow-up evaluation for the LVAD at an academic medical center. His wife was staying with him in the hotel room. She reported that she woke up early in the morning and saw the decedent walking around the room somewhat disoriented. He then collapsed on the floor and became unresponsive. The wife noticed that the decedent's LVAD controller was disconnected from the wall power source, and tried to plug the controller back in, but he was too far away from the power unit. Emergency medical services were called. Resuscitation was briefly performed, and the decedent was pronounced dead at the scene. The medical examiner was notified, and a death scene investigator responded to the scene. Jurisdiction was assumed in order to investigate the possibility of accidental disconnection from the power supply.

An LVAD is an implantable cardiac device that prolongs life by providing mechanical circulatory support in the setting of end-stage systolic heart

failure. Living with an LVAD can dramatically improve a patient's quality of life, but a strict regimen of daily maintenance is required. Of note, LVADs require a continuous power supply for operation. Interruption of the power supply will result in catastrophic consequences, including death, within a matter of minutes. In order to ensure a continuous supply of power, the patient must wear portable batteries during the daytime, and plug into a wall power unit at night. Potential causes of power loss include intentional or unintentional disconnection from the power source, systemic power outage, failure to recharge batteries, or device failure. Alternatively, death may be due to underlying natural disease and unrelated to the LVAD. Sorting through these possibilities can be a challenge and requires some knowledge of a patient's daily maintenance regimen while living with an LVAD.

ME/Cs should be familiar with these potential complications of LVADs because disconnection from a power source may raise concern for accidental, suicidal or even homicidal manner of death. In this case report, we discuss the various issues encountered during this complex death investigation, including the use of device interrogation reports, to investigate the circumstances surrounding the death.

P40 A Case Series of Myocardial Infiltrating Quilty Lesions in Cardiac Allografts Associated with Sudden Cardiac Death.

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Although the Quilty lesion has long been familiar to transplant pathologists, its etiology and significance remains unclear. Some have suggested an association between these lesions and acute cellular rejection, while others propose a connection to antibody-mediated rejection. Some studies have even reported that Quilty lesions are more frequent in posttransplant biopsies among patients who die suddenly after cardiac transplantation.

We report cardiac autopsy findings in four patients, age 14 months to 49 years (mean= 17 years) who died 305 to 1003 days posttransplant (mean= 533 days). Pretransplant heart disease included viral myocarditis (1), ischemic cardiomyopathy (1), dilated cardiomyopathy (1) and refractory long QT syndrome (1). Sudden cardiac death post cardiac transplantation was the presentation in all four.

Severe narrowing (90%) secondary to cardiac allograft vasculopathy (CAV) was present in at least one main coronary artery in each patient. Large epicardial infiltrates composed of both T cells (CD3) and B cells (CD20 and CD79a) were present in each patient. Infiltration into the underlying myocardium was extensive in all three children and focal in the adult. Associated cellular rejection was mild (n=1) and moderate (n=2) while an acute myocardial infarct without significant cellular rejection was present in the fourth patient, a 13 year old male. Antibody-mediated rejection was not detected by C4d immunohistochemistry in any patient at autopsy. In situ hybridization for EBV was negative in all patients. Immunohistochemistry and molecular viral studies were negative.

Thus, we describe a group of patients with sudden death following heart transplantation that have both severe CAV and epicardial / myocardial infiltrates consistent with Quilty lesions. These cases provide additional insight, yet raise new questions, about the significance of Quilty lesions and their relationship to cardiac allograft vasculopathy, cellular rejection, and sudden death posttransplant.

P41 Right Ventricular Endomyocardial Fibrosis: A Neglected Cause of Sudden Cardiac Death in the Western World

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Endomyocardial fibrosis (EMF) is a progressive restrictive cardiomyopathy of unknown etiology, most often identified in young individuals originating from sub-Saharan Africa and other tropical regions. Though EMF is believed to be one of the most common types of restrictive cardiomyopathies worldwide, it is encountered very rarely in Western countries, and hence, has the potential to be overlooked or "missed" during a diagnostic workup of early cardiac symptoms. In addition, due to the fact that this diagnosis can be overlooked clinically (and due to the number of immigrants originating from areas in which this disease is endemic), forensic pathologists may come across this condition in sudden unexpected deaths.

As there is variable ventricular involvement with EMF, individuals may present with a variety of symptoms depending on which ventricle of the heart is more affected. Isolated right ventricular (RV) involvement generally presents insidiously with symptoms of right-sided heart failure (such as hepatosplenomegaly and ascites). All forms of EMF have a poor prognosis, with death occurring due to chronic heart failure, thromboembolic phenomena, or a fatal arrhythmia.

We present a case of a 25-year-old man who had emigrated from the Republic of Congo to the United States (US) approximately four years prior to his death. Upon arrival to the US, he underwent a medical evaluation for atypical chest pain and palpitations. His electrocardiogram showed PR interval prolongation and an echocardiogram showed a heavily trabeculated RV. Cardiac magnetic resonance imaging (MRI) demonstrated enlargement of the right atrium, apparent hypoplasia of the right ventricular apex, and possible prior inflammation or fibrosis. The decedent was subsequently lost to follow-up.

The decedent was found deceased in bed with no evidence of injury or recent drug use. Autopsy examination was remarkable for dilation of the right atrium and right ventricle, with diffuse right ventricular fibroelastosis that enveloped the papillary muscles. There was obliteration of approximately a third to half of the right ventricular cavity at apical and mid-ventricular levels due to the extent of involvement by EMF. The remainder of the autopsy examination and ancillary studies performed (including toxicology examination) was negative for any competing causes of death.

This case illustrates the importance of a thorough review of a decedent's history (including comprehensive medical and social history) during medical evaluation, and when possible, prior to autopsy examination. Forensic pathologists should be aware of this entity when formulating differential diagnoses for individuals that die from apparent sudden cardiac death.

P42 The Curious Case of a Bloodless Aortic Rupture: Sudden Death Due to Aortic Rupture into the Lung

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Background: Sudden death due to rupture of the thoracic aorta may occur due to bleeding into the pericardial sac, pleural cavity, esophagus, or trachea; rupture into the lung is relatively rare. Aortic inflammation contributes to compromise of vessel integrity and is most often due to underlying atherosclerosis. By contrast, aortitis due to infection and non-infectious vasculitides is rare and may be further classified by characteristic histologic patterns.

Case Presentation: The decedent was an 87-year-old man with no previous history of aortic aneurysm or dissection who died suddenly of thoracic aortic rupture into the left lung. Gross examination was

remarkable for extensive aorta-to-lung adhesions, severe atherosclerosis, and multiple aortic tears with an "in-and-out" pattern of aortic dissection. Histologic examination of the aorta revealed focal aortitis with a suppurative pattern of inflammation and extensive necrosis, frequently seen in infectious aortitis.

Conclusions: A suppurative pattern of focal aortitis may occur in the absence of clinical history of infection or detection of an infecting organism and likely served as a subacute etiology for the adhesions between the lung and aorta, thus increasing risk of aortic rupture into the lung parenchyma and sudden death.

P43 The Significance of Axonal Spheroids in Diffuse Axonal Injury at the Time of Autopsy

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Diffuse axonal injury (DAI) is a clinicopathologic entity most often seen at the time of autopsy which typically indicates significant head trauma prior to death. In up to 50% of cases with head injury, DAI is observed microscopically, even in the absence of grossly identifiable injury. Motor vehicle accidents are the most common setting in which DAI is seen at the time of autopsy. Often, beta amyloid precursor protein is used in conjunction with standard H&E stains in cases of suspected DAI to highlight axonal damage in multiple areas of brain parenchyma. Neurofilament stains can also be used to highlight axonal spheroids in greater numbers than are routinely seen on H&E stain. The most common areas in the brain which are affected by DAI and show axonal spheroids include areas of white matter such as the corpus callosum, thalamus, and brainstem. Axonal spheroids can be seen in other conditions and do not necessarily indicate DAI in and of themselves, without the appropriate context.

Four cases with axonal spheroids were identified via a search of medical charts in the University of Arkansas for Medical Sciences' database from 2009 through 2017. All cases were diagnosed at the time of autopsy. The causes of death for the cases include two motor vehicle accidents, one case of status epilepticus, and one case of head trauma followed by a fall from standing while hospitalized. The ages of the decedents range from 16 to 49, and include two males and two females. The sections taken from the brains were selected based on autopsy protocol at the University of Arkansas for Medical Sciences and Arkansas Children's Hospital. It was observed that the areas of the brain most affected by DAI in these cases included the hippocampus, right frontal lobe, temporal lobe white matter, and medulla oblongata, consistent with previous studies of DAI, while thalami were involved in status epilepticus case. These areas in particular were likely to demonstrate axonal spheroids, pointing to a differential diagnosis, which included DAI.

In this case series review, we evaluate the cause of death for each patient in relation to the degree of DAI observed, the efficacy and necessity of special stains to determine the presence of DAI, and the significance of axonal spheroids in the diagnosis of DAI. We also discuss other entities in which axonal spheroids are observed, and compare the distribution pattern of axonal spheroids between DAI and others.

P44 Death Due to Nonbacterial Thrombotic Endocarditis in the Setting of Antiphospholipid Antibody Syndrome and Factor V Leiden Deficiency: A Case Report

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Background:

Nonbacterial thrombotic endocarditis (NBTE) is a rare disease causing sterile platelet thrombi and fibrin deposition on the heart valves resulting in a wide range of clinical manifestations including valvular insufficiency, coronary artery thrombosis, myocardial infarction, and death. NBTE is strongly associated with conditions that cause hypercoagulability, including malignancy and antiphospholipid antibody syndrome (APS). A diagnosis of NBTE at autopsy warrants a thorough review of the clinical history and complete autopsy findings to assess for conditions predisposing to NBTE.

Case Report:

A 44-year-old woman with a medical history significant for severe aortic stenosis, recent STEMI, Factor V Leiden deficiency, APS, and morbid obesity was admitted to the hospital 10 days prior to death for an acute myocardial infarction (MI). An echocardiogram (ECHO) showed an ejection fraction of 40-45%. The patient was deemed to be unstable to undergo valve replacement at that time and was discharged home. Three days prior to death, family members found her unresponsive at home and EMS was called. The patient awoke during transport and reported difficulty breathing. On admission, a repeat ECHO showed a reduced ejection fraction of 20%. During admission, the patient was found unresponsive in her room and advanced cardiac life support (ACLS) measures were initiated but unsuccessful.

Methods:

An autopsy was performed along with a review of the literature.

Results:

Internal examination showed a markedly enlarged heart (710 g) and left ventricular hypertrophy. The aortic valve contained large, red brown friable vegetations that substantially narrowed the valve circumference. Histologic examination of these vegetations revealed fibrin deposition without bacterial colonization or acute inflammation. No underlying valvular pathology was identified. In addition, multiple cardiac infarcts of varying ages and thrombosis in the anterior intraventricular artery (LAD) were identified. Notably, there was no significant coronary arterial atherosclerosis. The cause of death was aortic stenosis due to NBTE and MI due to coronary arterial thrombosis arising in the setting of antiphospholipid antibody syndrome and Factor V Leiden deficiency.

Discussion:

NBTE is a disease often diagnosed at autopsy, which commonly arises in the setting of hypercoagulable conditions. When NBTE is identified at autopsy, the forensic pathology should be aware of the potential conditions associated with NBTE and perform a review of the clinical history to identify significant conditions that caused/ contributed to death.

P45 Dysembryoplastic Neuroepithelial Tumor: An Unexpected Cause of Seizures and Death

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Introduction:

Dysembryoplastic Neuroepithelial Tumor is a benign glioneuronal neoplasm which may be a rare cause of seizures in young adults.

Case Report:

A 43 year old man with a history of left ophthalmic artery aneurysm, seizures, and complaints of recent headaches was found dead at home. Autopsy revealed a 3.2 x 3.0 cm left frontal lobe brain tumor. Postmortem

toxicology was positive for therapeutic levels of levetiracetam and topiramate.

Grossly, a discrete, multinodular mass was identified within the left frontal lobe. Histology revealed a heterogenous neoplasm with areas of oligodendrocyte-like cells, with perinuclear halos in a mucinous background. Tumor cells were cytologically bland. The lesion did not invade adjacent brain parenchyma. Mitotic figures, vascular endothelial proliferation, and necrosis were absent. The histologic and staining findings were diagnostic of Dysembryoplastic Neuroepithelial Tumor, WHO grade I.

Discussion:

Dysembryoplastic Neuroepithelial Tumor is a benign glioneuronal neoplasm, frequently supratentorial, and most often in the temporal lobes. Involvement of the frontal lobe, as in this case, is the second most common location.¹ The tumor is considered a neuronal and mixed neuronal-glia tumor and often reveals multinodular architecture with a heterogenous cell population. The incidence is approximately 1.2 percent in individuals under 20 years and 0.2 percent in individuals over 20 years of age.¹ Seizures are the most common presenting symptom, although a fraction of patients only experience headaches.² Seizure disorder of any etiology may prove lethal and be considered a cause of death in the absence of alternative causes of death following complete autopsy. Patients are generally symptomatic with intractable seizures by their early 20s.³ Low grade cerebral neoplasms such as ganglioglioma, oligodendroglioma, astrocytoma, and dysembryoplastic neuroepithelial tumors are the etiology of treatment resistant epilepsy in 10- 30 % of patients. Treatment involves complete surgical resection of tumor with a favorable prognosis and a high cure rate of epilepsy in younger patients. Success rates decrease with increased patient age.³ Without resection, as in this patient, Dysembryoplastic Neuroepithelial Tumor is likely to cause seizure activity.

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P46 Hydroxychloroquine-Induced Cardiomyopathy

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Introduction

Hydroxychloroquine (HCQ), a 4-aminoquinoline, is a drug that is often used in the treatment of various rheumatologic disorders such as systemic lupus erythematosus, rheumatoid arthritis and scleroderma. Although generally well-tolerated, a potential serious but extremely rare side effect of HCQ treatment includes cardiotoxicity. Here, we report a rare fatal case of HCQ-induced cardiomyopathy in a patient on long term HCQ therapy.

Case Presentation

The decedent is a 73-year-old Hispanic woman was found unresponsive at home in bed by her husband. A review of the medical records provided revealed a past medical history of chronic pain, progressive systemic sclerosis, "CREST" syndrome, osteoarthritis, and hypertension. Her

medications included 200 milligrams of HCQ taken twice a day since 2006 to treat her rheumatologic disease.

Results

At autopsy, the heart weighed 510 grams. The pericardium, epicardium, and endocardium were smooth and unremarkable. The coronary arterial system showed patchy calcified atherosclerosis with up to 30-40% stenosis of the left anterior descending coronary artery. The cardiac valves were unremarkable. The left ventricular cavity was slightly dilated. The cut surface of the myocardium shows a diffusely patchy, mottled tan appearance. Histologic sections from the left ventricle showed extensive, multifocal myocardial fibrosis and hypertrophic myocytes with rare focal lymphocytic infiltrates. Of note, many of the cardiomyocytes demonstrate extensive vacuolization under light microscopy. Postmortem toxicology identified HCQ levels of 39,000 ng/mL.

Discussion

Previously described presentations of HCQ-induced cardiomyopathy can be variable and include restrictive cardiomyopathy, dilated cardiomyopathy, or conduction abnormalities such as bundle branch and atrioventricular block and rarely even death. Endomyocardial biopsy has proven useful in diagnosing HCQ-induced cardiomyopathy. Myocytes typically appear enlarged with prominent clear vacuolization by light microscopy, and electron microscopy shows sarcoplasmic myelinoid and curvilinear bodies. HCQ may interfere with lysosomal digestion, resulting in accumulation of glycogen and membrane phospholipids within the cells, leading to the vacuolated appearance of the cardiac myocytes. Awareness of the association between HCQ therapy and cardiomyopathy by clinicians is essential, and regular screening with 12-lead electrocardiogram and/or transthoracic echocardiography to detect conduction system disease and/or cardiac wall changes may be considered in long term HCQ-treated patients. In conclusion, we present a rare fatal case of HCQ-induced cardiomyopathy in the forensic setting.

P47 A Rare Case of Takayasu Arteritis Diagnosed at Autopsy and Review of the Literature

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Here we present a case of Takayasu Arteritis (TA) in a 19-year-old black man diagnosed unexpectedly at autopsy. Comorbidities included systemic lupus erythematosus and Neurofibromatosis Type I. In the month prior to death, the decedent visited the Emergency Department (ED) four times with chronic chest pain and fatigue. Echocardiogram showed severe aortic regurgitation. Computed Tomography Angiography showed a small pericardial effusion. Magnetic Resonance Angiography showed cardiomegaly and left ventricular dilation. No radiologic impression noted aortic changes consistent with vasculitis. He was found dead the morning following his last ED visit.

TA is a rare idiopathic vasculitis of large blood vessels, such as the aorta and its primary branches. Prevalence is highest in Japan and predominantly affects females in the second or third decades of life. The annual incidence in the Japanese population is estimated to be 3.6 new cases/million, in contrast to the Western population of 1-2 cases/million. Signs and symptoms manifest according to what degree vessels are affected and can include constitutional findings such as fever, malaise, and anorexia. Classic features include limb claudication, decreased/absent distal pulses, vascular bruits, blood pressure discrepancy between arms, and hypertension. Gross examination in this

case revealed features of TA including a rigid aorta with concentric mural thickening on cut section, pericardial adhesions, left ventricular hypertrophy, thickened aortic valve cusps, and occlusive concentric thickening of the left anterior descending and diagonal coronary arteries. Microscopic examination revealed chronic vasculitis of the aorta and its major branches. In a person less than 50 years old, this is characteristic of TA. Acutely, vasculitis in TA originates in the vaso vasorum and consists of a mixed inflammatory infiltrate of mononuclear cells. Granulomatous inflammation can also be observed with multinucleate giant cells and necrosis of smooth muscle fibers. Progression leads to mural fibrosis resulting in stenosis of the vessel, thrombus formation, neovascularization, and ischemic changes of surrounding tissue. TA is largely a clinical and radiographic diagnosis, making even a classic presentation challenging to identify. Current lab tests are non-specific and definitive diagnosis with arterial biopsy is invasive and often not feasible. With appropriate diagnosis and treatment, mortality from TA is relatively low, making the initial diagnosis at autopsy rare. TA may be encountered in the forensic setting due to the relatively young age and may be difficult to diagnose in an atypical demographic. Therefore, autopsy pathologists should be aware of the entity to ensure proper approach and diagnosis.

P48 A Case of Previously Unsuspected Cardiac Sarcoidosis Diagnosed at Autopsy and 23-Year Review of One Institution's Sarcoidosis Deaths

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Sarcoidosis is a poorly understood non-caseating granulomatous disease of unknown etiology. The incidence of the disorder is thought to be about 11 per 100,000 white individuals, and is considerably higher in the black population worldwide (approximately 34 in 100,000 individuals). Women are more commonly affected than men, and the usual age of presentation is between 30 and 50 years. Cardiac involvement by sarcoidosis is seen in 2-5% of patients with systemic sarcoidosis, and is often clinically undetected. The high rates of non-detection may be due to relative rarity of cardiac involvement, variability in presentation of cardiac sarcoidosis, or that there are no well-established clinical criteria for the diagnosis of cardiac sarcoidosis. Clinical presentation varies in cardiac sarcoidosis from totally asymptomatic patients to those with heart block, myocardial infarctions, or heart failure, to incidents of sudden cardiac death. Sudden cardiac death may be due to involvement of the heart's conduction system by sarcoidosis, which likely triggers a fatal arrhythmia.

We present a case of a 54-year-old African American male whose past medical history included hypertension, hyperlipidemia, and chronic urticaria. On the day of his death, he was witnessed to suddenly stand up, "grab his chest", and collapse. CPR was performed for approximately an hour, and his clinical cause of death was thought to be hypertensive and atherosclerotic cardiovascular disease.

The gross autopsy findings included a heavy heart (490g; reference 270g – 360g) with a white, firm, diffusely infiltrative process present throughout the myocardium. This process was identified microscopically as sarcoidosis, and was present in both the right and left ventricular myocardium and the interventricular septal myocardium, the papillary muscle, and on the pericardial surface extending into the left ventricular myocardium. Importantly, the process was present in the conduction system of the heart. Of note, none of the major coronary arteries were compressed by this process, and as a whole the major coronary arteries showed little to no involvement by atherosclerosis.

A review of autopsy cases over the last 23 years at our institution (n = 6900) revealed 30 cases of sarcoidosis (0.4%), a rate which is significantly higher than the general population. Of those 30 cases, 6

(20%) showed cardiac involvement; two cases out of 30 had a cause of death listed as cardiac sarcoidosis (6.6%).

This case illustrates a rare disease that emphasizes the importance of complete autopsy even in patients who might initially be deemed as natural deaths.

P49 Creutzfeldt-Jakob Disease Mimicking Neurosyphilis: A Complex Presentation, Histopathological Findings, and Special Precautions for Autopsy

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Creutzfeldt-Jakob disease (CJD) is a complex and rapidly fatal infection of the central nervous system with characteristic histopathology and radiology findings. Herein a case is presented of an 80-year-old male with a two month history of rapid cognitive decline and a positive RPR and FTA-ABS. He was admitted to the hospital and treated for presumed syphilis with high-dose penicillin. During the hospitalization, the patient developed intractable seizures and was transferred to the intensive care unit in status epilepticus with metabolic encephalopathy. His mental status failed to improve and he expired. An autopsy was performed, which revealed diffuse spongiform change throughout the cerebrum. Additionally, tissue was sent to the National Prion Disease Surveillance Center for immunostaining with 3F4, the monoclonal antibody to the prion protein. Immunostaining revealed granular deposits typical of prion disease. Despite the fact that this decedent underwent a full autopsy, the College of American Pathologists generally recommends that patients with CJD or suspected CJD undergo a limited autopsy to the brain only. A high index of suspicion is required, even in the context of simultaneous distracting diagnoses, such as the positive RPR in this case. Although there has been documentation of cases in which CJD was suspected but the patient had a final diagnosis of syphilis, to our knowledge, this is the first case to be published in which neurosyphilis was suspected but the patient's final diagnosis was CJD. Additionally, a review of protocols for safe handling of CJD tissue is presented.

P50 Determination of Cardiomegaly in Cases of Sudden Death in the Young

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Introduction: Cardiac events contribute to sudden death between age 1 and 40. Post-mortem genetic testing reveals a clinically relevant variant in 30% of cases. Accurate phenotype information from autopsy, including the presence of increased heart weight, may improve the interpretation of post-mortem genetic testing. No consensus benchmark exists to diagnose cardiomegaly at autopsy.

Study Design: A retrospective review of consecutive autopsies from homicides, suicides, and accidents in decedents aged 1 – 40 years was used to derive a model of normative heart weights (Chicago / Cook County, IL from 2014 – 2017). Multivariable model development was performed on a natural log transform of heart weight (data were randomly assigned to 50% training and 50% testing). A best-fit model was chosen based on standard model characteristics. Separately, we surveyed medical examiners (ME) and coroners to query their current methods of determining cardiomegaly. A published model of normative heart weights from autopsies in Sweden (27,645 autopsies, age ≥ 18) was chosen as an additional benchmark. Finally, the Northwestern Sudden Death Collaboration (NSDC) provided heart weights from cases of sudden death in ages 1 – 40. Heart weights from the NSDC were classified as "cardiomegaly" or "no cardiomegaly" based on each benchmark identified by ME/coroner surveys and by our proposed model.

Results: Among 3,247 autopsies, average age was 26.7 years (SD 7.1) and 85% were male. Mean heart weight was 367 g (SD 92.8). Sex, body weight, and height were significant predictors during model development. ME/coroner surveys (53 offices) used 21 references to determine cardiomegaly. When these reference methods were applied to the NSDC heart weights, between 15% and 78% of NSDC hearts were classified as having "cardiomegaly" (median rate 53%). The Chicago model classified 20/102 cases of sudden death in the young as having cardiomegaly on autopsy (19.6%). Classification using the Swedish model matched the Chicago model in 16/102 cases (15.7%) and all 4 discrepancies occurred in cases < 18 years of age.

Conclusion: Current benchmarks for cardiomegaly produce inconsistent results when applied to cases of sudden death in the young. We derived a model for classifying heart weight in a large, diverse urban population and tested the model in cases of sudden death in the young. The Chicago model provides a reference to determine cardiomegaly in children and adults. To the best of our knowledge, this is the largest reference for pediatric heart weights available.

P51 Overdose or Infective Endocarditis?: Chest Pain in the Setting of Acute Substance Use

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Intravenous drug users (IVDU) are a high risk group for infective endocarditis (IE). Others include prosthetic heart valves. Patient's with acute substance use might have a physician concerned firstly for overdose, but IE should always remain an etiology for an acute event. A 43-year-old Caucasian man with history of illicit intravenous substance use calls 911 from a hotel reporting difficulty breathing following use of alcohol, heroin, cocaine, and alprazolam. He reports non-radiating central chest pain, denying nausea, diaphoresis, or dizziness. EKG shows STEMI and he is given baby aspirin and sublingual nitroglycerin. He is administered 0.2mg Narcan. EKG remains erratic with ST elevations, PVCs, ventricular fibrillation, atrial flutter and fibrillation, and sinus tachycardia.

In the ED, he has altered mental status, is febrile (102.0 F), tachypneic (RR: 43), pulse of 71, and hypotensive (BP: 89/47). An initial drug screen is narcotic negative and benzodiazepine "presumed positive". Labs show: WBC of 29.70, an absolute PMN of 27.02, and 15% bands. Procalcitonin is 49.13, positive Troponin is 0.999. BMP: BUN of 44, and Cr of 4.1. A witnessed ventricular tachycardia consistent with torsade's de pointes occurs. He receives IV magnesium, sodium bicarbonate, IV hydration, and intubated. Despite 4L of normal saline, he remains aneuric and hypotensive. During central line placement, he experiences pulseless ventricular tachycardia. CPR and ACLS protocol are performed with the return of rapid atrial fibrillation pulse. He is placed on pressers but continues to decline. Limited bedside echo shows a segmental cardiomyopathy with a 30% ejection fraction without pericardial effusion. Valves are not interrogated. He succumbs to a third witnessed cardiac arrest 3 hours following admission.

Lab review indicates a severe systemic inflammatory response with end organ damage. Blood cultures are *Staphylococcus aureus* positive. He is status post aortic valve replacement and pacemaker placement 6 years prior due to a previous IE episode

At autopsy, there are signs of chronic inflammation with epicardial and myocardial fibrosis with acute and chronic inflammatory infiltrate and angiogenesis. The bioprosthetic aortic valve dehisced in the anterior suture line and its inferior surface is laden with verrucous bacterial

colonies. The heart and kidneys show recent superimposed upon remote infarcts. The lungs have an organizing bronchopneumonia. Right-sided IE is most commonly ascribed to IVDU, left-sided involvement when it occurs is more deadly, with production of embolic events. Patient's status-post prosthetic aortic valve replacement with a concomitant history of current IVDU, IE suspicion should be increased.

P52 Hypertrophic Cardiomyopathy in an 11-month Female Child: A Rare Etiology of a Sudden Cardiac Death

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The authors describe a peculiar case of hypertrophic cardiomyopathy (HCM) occurred in infant 11-months years old. The parents brought her to the local hospital E.R. because she was ill with fever. After the medical evaluation, paracetamol was prescribed and she was sent back home. The fever persisted after a week and the child was brought back to same E.R. again where the staff made diagnosis of bronchopneumonia. Because of the absence of a pediatric specialized unit inside the local hospital, she was sent near bigger hospital by ambulance. Nevertheless, during the ride, the baby suddenly went into cardiac arrest and died despite the cardio-pulmonary-resuscitation. The infant had no significant past medical history and she did not suffer from any pathologies at the birth. At the autopsy the child appeared well grown and nourished; the lungs appeared congested and the mediastinum's lymph nodes had increased volume; the heart had normal gross morphology but when it was dissected the cavity of the left ventricle appeared extremely small with thickening of the septum and of the left ventricle walls. The histology confirmed the bronchopneumonia and the heart slides showed disarray of the septum and the left wall ventricle's myocytes, while the right's walls were normal. The cause of death was a rare type of congenital cardiac hypertrophy and the bronchopneumonia was the contributing factor. In fact, the pathologists suggested that the death suddenly occurred only when the effects of the hypertrophic pathology were exasperated by the bronchopneumonia. The HCM is characterized by disoriented, hypertrophied, and irregularly configured cardiac myocytes (disarray). The infantile form of this disease is extremely rare (incidence: 3.6 per one million children). The electrocardiography is abnormal in 75-95% of the patients; the most common findings are those associated with left ventricular hypertrophy (LVH). The patients affected by HCM may show cardiac murmurs, hearth failure symptoms, syncope, arrhythmias and sudden death. The etiology in children includes genetic syndromes or glycogen, mitochondrial and neuromuscular diseases. In the present report neither storage disorder nor syndromic findings with dysmorphic features were ascertained in the clinical history or postmortem examination. The family medical history was negative and genetic testing are pending.

P53 Glycogen Storage Disease Type IV Diagnosed at Autopsy in a Preterm, Still Birth Delivery to Mother with Recurrent Pregnancy Losses

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Background:

Glycogen storage disease type IV (GSD IV; Anderson's disease) is a rare autosomal recessive disorder resulting from a mutation in the GBE1 gene, leading to deficiency of glycogen branching enzyme (GBE) and aggregation of insoluble glycogen in various tissues. Given its rarity and diversity of presentation, diagnosing GSD IV in the autopsy setting is

difficult, particularly when suspicion is low and clinical history is non-specific.

Case History:

A 35 4/7 weeks gestational age female was stillborn to a G6P2L1 mother. The pregnancy course and delivery were uncomplicated; however, initial APGAR score was 1. Resuscitation efforts were unsuccessful and the body was referred for autopsy.

Findings:

The body was a well-developed, non-macerated, phenotypic female. Gross examination revealed no congenital abnormalities. The placental examination was notable for a short, two vessel cord with a single umbilical artery. Focal acute chorionitis was present microscopically.

Histologic examination was unremarkable except for numerous pale blue, ground glass-like inclusions within cardiomyocytes, presumed to be secondary to autolytic change. The cause of death was certified as fetal demise of unknown etiology in the setting of acute chorionitis with premature rupture of membranes and short umbilical cord with single umbilical artery.

Persistent suspicion of the cardiac inclusion etiology resulted in further work-up. Periodic acid-Schiff (PAS) and Periodic acid-Schiff with diastase (PAS-D) stains were applied to the cardiac muscle and the inclusions were PAS positive, diastase resistant. Repeat examination identified inclusions in the liver, placenta, and brain; liver and placental inclusions were PAS positive, diastase resistant. Electron microscopy revealed non-membrane bound cytoplasmic inclusions comprised of fine granular and short fibrillary material suggestive of amylopectin-like material. Chromosomal microarray analysis revealed a 360 kb deletion of 3p12.2 including exons 2 through 16 of the GBE1 gene on one allele. The cause of death was revised to GSD IV.

Conclusion:

Stillbirth is commonly encountered in the autopsy setting in association with unremarkable findings and scant clinical history. In the current case, the only findings suggestive of a glycogen storage disease were cardiomyocyte inclusions initially interpreted as postmortem artifact. A strong index of suspicion was required to determine GSD IV as the ultimate cause of death, illustrating the need for critical evaluation of presumed artifact in the setting of fetal demise of unknown etiology.

P54 Sudden Unexpected Death Associated with Volvulus

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Case History: A previously healthy 8-year-old girl complained to her parents about stomach pain and missed school the prior day. The next day, she had multiple episodes of emesis and her parents treated her with ginger ale and Pepto-Bismol. The following morning, the child was found unresponsive with frothing around the nose and emesis from the mouth.

Autopsy: At autopsy, a volvulus (with infarction) of the distal small intestine and a nontraumatic mesenteric defect was found. Also identified was a malrotation of the large intestine, involving the ascending and descending colon.

Discussion: Acute abdominal pain in children is a rather non-specific symptom with a broad range of possible etiologies. Without the aid of testing modalities, it is clinically difficult to correctly identify the cause of abdominal pain, especially in children who have difficulty in communicating the location and nature of the pain. Additionally, malrotation is rarely seen in older children and presents with no or intermittent symptoms. Malrotation causes torsion/occlusion of the blood vessels in the bowel and impairs blood supply to that area of bowel. This can lead to bowel necrosis, which could be fatal if left untreated. Although rare, the misdiagnosis of volvulus could have grave consequences particularly in the pediatric population. There are two types of intestinal volvulus: midgut volvulus and sigmoid volvulus. Midgut volvulus occurs mostly in the pediatric population when there is also a malrotation. Therefore, it should always be considered as part of the differential diagnoses of abdominal pain in this patient population.

P55 Pop Goes Pathology: How Pathologists are Portrayed in Popular Culture & Implications for Recruitment

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Background: Pathology has long suffered from misconceptions about the specialty among the public as well as low interest from medical students when choosing a specialty during medical school. Since people have been shown to learn various concepts from television, how pathologists are portrayed on TV shows likely plays a role in both the public misconceptions of pathology and the lack of interest in the specialty from medical students. Understanding the messages that are presented on television will be important in addressing stereotypes and misconceptions about pathology.

Methods: Television shows featuring pathologists were identified via word of mouth, social media, and targeted Google searches and were analyzed for patterns and themes in how pathologists were presented. Basic information such as the type of television show, type of pathology shown, and gender and ethnicity of the characters was recorded. The accuracy of how the job and work environment were portrayed were noted. The personality, attractiveness and knowledge of the characters, with particular attention to whether they embodied the stereotype of pathologists as odd/eccentric, boring, and obsessed with death, were also analyzed.

Results: Thirty-four TV shows were identified, including 4 medical shows, 28 featuring the justice system, and 2 in the "other" category. Seventy-six pathologist characters were identified, including 74 (97%) forensic/autopsy pathologists, 1 surgical pathologist, and 1 hematopathologist. Only 8 characters (11%) embodied the stereotype of being odd, eccentric, boring and/or obsessed with death, with most pathologists portrayed as attractive and appealing with positive contributions to the plot. Forensic pathology was inaccurately portrayed with misleading terminology, improper protective equipment, and roles in death investigation that fell outside of medicine. Pathology as a specialty was undervalued, as was seen in forensic pathologists who previously failed at clinical medicine, minimization of the training required, non-pathologists performing pathology tasks, and the lack of surgical and other types of pathologists on television.

Conclusion: While most pathologists on television are portrayed as attractive and appealing, the specialty itself is inaccurately portrayed and undervalued. Medical students are likely to be dissuaded from choosing pathology in general, and forensic pathology in particular, due to the perception that the specialty is easy and best suited to physicians who cannot succeed at clinical medicine. Action must be taken to counteract the misinformation and negative attitudes toward pathology on television.

P56 The Tissue Recovery Personnel Guide to Medical Examiner and Coroner Cases

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Background: An estimated 75% of potential organ and tissue donors are under the jurisdiction of a medical examiner or coroner. Positive working relationships between organ and tissue procurement organizations and medical examiners and coroners is essential in assuring both donation and a comprehensive medicolegal death investigation may take place.

The Problem: Contributory factors resulting in the medical examiner or coroner decline of donation including a lack of standard procedure, training or practices promoting the preservation of evidence.

Despite the essential role medical examiner and coroner relationships have on donation, national guidance or training material had not been developed for the donation community. While much emphasis has been placed on the medical examiner or coroners support of donation there has been little focus given to how the donation community may support the medicolegal death investigation process.

Solution: Develop a training and guidance document on a national platform with American Association of Tissue Banks (AATB) to outline best practices, procedures and potential solutions to improve awareness and processes focused on the development of best practices on cases undergoing a medicolegal death investigation and foster a culture which supports the medicolegal death investigation process.

Outlined practices include but are not limited to:

1. Standard practices and procedures in communications and approach for recovery permission.
2. Outlined recommended practices for reporting and providing medical records donor records, and findings to the medical examiner or coroner before and after donation as well as medical records generated after donation, i.e. serological or NAT infectious disease testing results or final culture results.
3. Recommended practices and documentation to assure the preservation of a traceable chain of custody.
4. Standard practices in identification and reporting of abnormal findings prior to and during the recovery process.
5. Recommended practices for collection, storage, and preservation of specimens toxicology samples.
6. Recommended practices for pre-recovery and intraoperative photographic practices, distribution, and storage of photographs on behalf of the medical examiner or coroner.
7. Recommended practices to offer radiography upon medical examiner or coroner request.
8. Recommended practices to promote the documentation, collection, and preservation of possible thrombus, thromboembolus, or postmortem blood clots.

Implementation: This guidance document will be published internationally for all American Association of Tissue Banks members and tissue banking establishments.

P57 Disinfectant and Antiseptic Poisonings: A Report of Twelve Fatal Cases and Review of the Literature

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Recent decades have seen tremendous increases in the use of antiseptics and disinfectants. They are found in homes and health care

facilities in the form of liquids, gels, foams, sprays, and wipes; when used improperly or in excess, they can be toxic. While most contain bitterants to deter ingestion, children may find their scents and colors appealing. Adults may use them as a means of self-harm or be unaware of their toxic nature, ingesting them as a substitute for alcohol.

Common antiseptics include hand sanitizers and isopropyl rubbing alcohol. Hand sanitizers contain 60%–95% isopropanol, ethanol, or n-propanol, with some even containing some methanol. Isopropyl rubbing alcohol contains approximately 70% isopropanol. When ingested, isopropanol is metabolized into acetone, causing CNS depression. When methanol is ingested, it is oxidized into formaldehyde, then formic acid, leading to an anion gap acidosis with weakness, nausea/vomiting, headache, dyspnea, coma, and death.

We report twelve cases of antiseptic and disinfectant poisoning over seven years, including one confirmed isopropanol-based hand sanitizer poisoning, two suspected hand sanitizer poisonings with elevated methanol levels, and nine isopropanol poisonings. The circumstances surrounding death, autopsy findings, and toxicology results will be presented.

Due to the rarity of these cases, increased awareness is needed. Medical/social history may reveal prior toxic ingestion(s), seeking of alternate alcohol sources, or suicidal behaviors. If the decedent was hospitalized, review of laboratory data from the admission may reveal electrolyte abnormalities (i.e. acidosis) or a positive toxicology screen. Scene investigators should document potential poisons (household cleaners, hand sanitizers, and others), for safety data sheet review and comparison to toxicological findings. They may be found in cabinets, garages, bathrooms, vehicles, and garbage cans. Numerous containers of the same or similar products is noteworthy. Potentially toxic substances may be found in open or unlabeled containers or drinking glasses. If products are unable to be collected, photographs with close ups of the product labels should be taken. While witness statements may be the most valuable indicators of such poisonings, recent purchases of such agents or internet search histories for toxic substances are also important. Autopsy may document a strong or unusual odor or color in the gastric contents. Gastric contents, along with blood and urine, should be collected. Due to the often-subtle nature of these poisonings, toxicology results may be the only indication. Retrospective investigation may be difficult and the source of the poisoning and manner of death may remain undetermined.

P58 Post-Traumatic Hypopituitarism: A Retrospective Analysis of Forensic Cases

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BACKGROUND: In the US, approximately 1.7 million patients seek medical care for traumatic brain injury (TBI) each year, with 3.1% of these patients suffering lethal injuries and up to 2% of the population experiencing long-term disability attributable to TBI. Post-traumatic hypopituitarism (PTH) is a recognized phenomenon with a prevalence of at least 15% in TBI. PTH makes significant contributions toward morbidity—associated with diminished quality of life and impaired recovery—however, the condition remains underdiagnosed and overlooked by clinicians, in part due to nonspecific symptomatology. Reports of associations between PTH and patient subpopulation or injury severity are variable, complicating the establishment of guidelines to triage trauma patients for early intervention or additional monitoring.

DESIGN: Forensic autopsies were collected from the pathology files spanning the years 2010 to 2017. Cases with submitted pituitary tissue and a history of trauma were included in the final analysis. A retrospective

analysis of the data, including gross and histologic findings, decedent characteristics, and type of trauma, was performed.

RESULTS: Pituitary findings showed a range of acute pathology, including edema and congestion; dural and meningeal hemorrhages; acute infarction; and signs of previous hemorrhage and interstitial fibrosis.

Examination of the data demonstrates that of all the age groups, the frequency of pituitary findings is highest in the 1-18 years of age subset (44.4%). Females have a slightly higher frequency than males (40% and 35.1%, respectively). Of all the trauma types, blunt force trauma involving at least a skull fracture has the highest percentage of pituitary pathology (57.9%, $p = 0.021$). None of the gunshot or shotgun wounds limited to the chest, abdomen, torso, and extremities are associated with pituitary findings. Similarly, the pituitary findings in trauma not involving firearms is lowest in the subset limited to injuries to below the head and neck (15.8%, $p = 0.038$).

CONCLUSION: Acquired hypopituitarism following trauma has a complex pathophysiology and variable clinical presentation, with deficits appearing months after injury and impeding rehabilitation and recovery. This retrospective study demonstrates greater risk of pituitary injury in patients subject to blunt force trauma to the head, particularly in cases with sufficient impact to cause fracture. Such findings may suggest incorporation of reflexive neuroendocrine evaluation in the workup for subsets of trauma patients. Additionally, future histologic investigation into pituitary injuries may provide insight into the pathophysiologic mechanisms of PTH and optimal therapeutic approach.

P59 Injury as an Impetus for Deep Vein Thrombosis in a Patient with History of Immobilization and Pulmonary Embolism

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The patient is a 54-year-old man with no known past medical history from the East Coast of the US. He reportedly recently returned from a vacation in southern Asia. The patient took a flight home that was about 23 hours in length in total. On the morning of his death, he told a family member that he couldn't breathe and then collapsed. Emergency rescue personnel were summoned but resuscitative attempts were unsuccessful. The case was sent to OCME for external exam only, the cause of death being due to pulmonary thromboembolism due to prolonged immobilization, and the manner of death being natural. During external exam, bandages and bruising were seen on the patient's left lower extremity. This prompted the OCME team to convert the patient's case to autopsy and investigate the possibility of an accident leading to the formation of the patient's presumed thromboembolism. Further investigation revealed relevant details of what occurred during the patient's vacation. A family friend stated that while on his vacation, the patient suffered two accidents driving a moped, the second accident occurring on the day before his planned long airplane flight home. The patient then returned home with bandages on his left ankle and was observed limping by his family and friends. In the days following his return, he complained of shortness of breath, but did not seek medical treatment. Autopsy revealed bilateral pulmonary thromboemboli with deep vein thrombi in the left lower extremity with associated healing blunt force injuries from the moped accident, establishing the manner of the patient's death as accidental. The prolonged immobilization in the setting of his long distance flight likely contributed to the formation of the clots. This case highlights the importance of external exam, clinical history, and travel history on establishing the manner of death, and that pulmonary thromboemboli may not always be due to natural causes. Additionally, this case reinforces important risk factors and clinical symptoms for the development of deep

vein thrombosis and subsequent life-threatening pulmonary thromboemboli.

P60 Brainstem Hemorrhage with Unexpected Histology

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A 50-year-old African American woman with no known medical problems reportedly complained of stomach pains, fatigue, and "not feeling well." The following day she was found dead in her home with vomitus at multiple locations in the house. A bottle of aspirin was found next to the bed. No criminal activity was suspected. There was no history of alcohol or drug abuse.

Autopsy revealed marked diffuse cerebral edema with secondary bilateral occipital lobe infarcts. A 3.5 x 2.6 x 2.3 cm "hematoma" filled the fourth ventricle, distorting the midbrain and obstructing the cerebral aqueduct. This led to dilatation of the lateral ventricles and cerebral edema. The differential diagnosis included a hypertensive hemorrhagic stroke in the brainstem or giant berry aneurysm or other vascular malformation. It was therefore surprising that microscopy revealed this "hematoma" to be a neoplasm. Toxicology failed to show any salicylates or illicit drugs, including cocaine.

Histology revealed a markedly hemorrhagic tumor with heterogenous neuronal (synaptophysin-positive) and glial (some GFAP positivity) cells in a slight fibrillary background, with diffuse neuronal atypia and dysplasia. No eosinophilic granular bodies or Rosenthal bodies were identified. This neoplasm defied easy classification and was ultimately diagnosed as a ganglioglioma/glioblastoma.

Primary intracranial tumors in adults are rare and account for 1.4% of all new cancer cases, with supratentorial locations easily dominating over the infratentorial. The immunohistochemical staining and microscopic features of this tumor are more consistent with those of a glioma – likely a ganglioglioma or one that has progressed to a glioblastoma. While medulloblastomas are much more commonly seen in the fourth ventricle, the histological findings are quite inconsistent with this type of tumor. Furthermore, gangliogliomas, while preferentially affecting the temporal lobes, have been found in other locations intracranially and must be considered as a differential diagnosis for an intracranial tumor.

In this case report, we present a hemorrhagic ganglionic neoplasm arising in the brainstem producing obstructive hydrocephalus, cerebral edema, and sudden death. The marked degree of hemorrhage in the tumor mimicked a hypertensive brainstem hemorrhage.

P61 Spontaneous Extracranial Vertebral Artery Dissection in a Neurofibromatosis 1 Patient with Bilateral Intrathoracic Spinal Meningoceles around the Scoliosis: Report of an Autopsy Case

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Neurofibromatosis 1 (NF1) is a common autosomal dominant disorder that causes several systemic diseases. Many studies have reported that NF1 is associated with intrathoracic meningoceles and scoliosis. The incidence of vertebral artery dissection is estimated to be 1-1.5 per 100,000 population. We experienced an autopsy case of massive intrathoracic hemorrhage due to spontaneous vertebral artery dissection in a patient with NF1, who had intrathoracic spinal meningoceles and scoliosis. A 47-year-old man was found dead at his home in the morning. He had a

history of NF1 including numerous cutaneous neurofibromas and hyperpigmented macules, scoliosis, and deformity of the leg. The autopsy revealed the dissection and rupture of the left vertebral artery, and a pseudocyst that had formed due to arterial leakage on the wall of the meningocele on the left side. The pseudocyst had eventually ruptured and leaked blood, resulting in a massive hemothorax on the left side. Thus, it was revealed that the patient had suffered from NF1-associated intrathoracic meningoceles and scoliosis, and we concluded that the cause of his death was a massive hemothorax on the left side, caused by the dissection and rupture of the left vertebral artery.

P62 Neuropathological Correlates in a Post-Mortem Adult Patient with History of Childhood Mumps Encephalitis

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Mumps encephalitis is a rare but devastating consequence of mumps infection. Few studies have characterized post-mortem neuropathological correlates in patients with a history of mumps encephalitis. Here, we describe the case of a 53-year-old patient who suffered long-standing neuropsychiatric complications of mumps infection during childhood. Brain autopsy revealed prominent hydrocephalus in the absence of remarkable aqueductal stenosis and extensive and continuous ependymal denudation throughout the ventricular system. In addition, focal periaqueductal gliosis, Rosenthal fibers and macrophage accumulations were noted. These findings support primary ependymal injury as a pathophysiological mechanism in the subsequent development of hydrocephalus following mumps encephalitis.

P63 A Case of Idiopathic Hepatic Artery Pseudoaneurysm Diagnosed at Autopsy

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Hepatic artery pseudoaneurysm (HAP) is a rare condition in which there is a breach in the vascular wall that leads to an extravascular hematoma that freely communicates with the intravascular space. Sixty percent of cases are reported to be clinically silent, and some may rupture, causing potentially fatal hemoperitoneum. Hepatic artery pseudoaneurysms may arise secondary to blunt or penetrating trauma directed at the liver or invasive abdominal procedures, and some are idiopathic. Here we present a case of ruptured hepatic artery pseudoaneurysm discovered at autopsy with no known cause.

P64 Soccer, A Silent killer in Central American Teenagers?

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Congenital coronary artery anomalies, although rare in the general population, are a common cause of sudden cardiac death in the pediatric and young adult populations. The exact prevalence remains unclear with a significant amount of cases not recognized or diagnosed until death. The most common of these anomalies are those of aberrant origin which includes origin of an artery from the opposite sinus of Valsalva, origin of an artery from the pulmonary trunk, or high origin from the correct sinus. Of these three subsets, the left main coronary artery originating from the right sinus of Valsalva is the most likely to result in sudden cardiac death in the young adult population. Although rare, this anomaly results in sudden death in greater than 50 percent of those patient's affected, with a majority of these deaths occurring during physical exertion. There is difficulty in early diagnosis as most patients have no symptoms prior to

death and even when symptoms are present, common diagnostic procedures such as electrocardiography will often have negative findings. I am presenting two cases of Central American teenagers who collapsed while playing soccer and were pronounced dead shortly after. Autopsies of both young men were significant for an anomalous left main coronary artery that originated in the right sinus of Valsalva. The first case is that of a 15-year-old male teenager from Guatemala who had been cleared to play sports by a cardiologist after a negative workup following six months of complaints of chest pains. Additional autopsy findings included subendocardial fibrosis and pulmonary edema. The second case is that of a 16-year-old male from El Salvador who complained of not feeling well immediately prior to collapsing, but had no previous complaints. His additional autopsy findings included right ventricle dilatation and pulmonary edema.

Although much attention is given to coronary artery anomalies in the pediatric health community as it relates to organized scholastic sports, these cases highlight the need to expand this awareness to less popular recreational sports activities, especially amongst the growing population of Central American immigrants.

P65 An Autopsy Case of a Charred Body with an Antemortem Diagnosis of Juvenile Alzheimer's Disease

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A charred female body in her late 40s with a history of juvenile Alzheimer's disease (JAD) is examined by a medico-legal autopsy because of a house fire from unclear cause. The deceased had had progressive dementia for 7 years and gait disorder for 3 years. Postmortem computed tomography (PMCT) taken right before the autopsy and macroscopic external examinations demonstrated no typical atrophic changes in the brain. Cerebral atrophy was indistinct especially in its anterior part due to shrink by heat coagulation that took place after the victim died at the scene of a fire.

The brain was histologically examined after whole fixation in 20% formalin solution. It was sliced into coronal sections to attempt evaluating atrophic changes. Specimens were stained with hematoxylin and eosin, Klüver-Barrera and by immunohistochemistry (IHC) with anti-amyloid beta (Ab) (BAN50, Wako). Senile plaques stained by IHC with Ab were remarkably seen in cortexes of main cerebral lobes, basal ganglia and other grey matter areas including the cerebellum. No ischemic focus, other supposed degenerative changes or marked obstruction of cerebral arteries were observed in examined specimens.

Postmortem diagnostic examinations for exposure to fire revealed inhalation of carbon particle in the lung tissues and elevated saturation of carbon monoxide-hemoglobin (79% in the left heart blood). No special laboratory finding suggesting other cause of death was obtained.

We would have not been able to notice the special conditions that explain for why the deceased had no chance to escape from the scene, if there was no clinical information of neurological history. It can be described that the main characteristics of this case was modified or "masked" macroscopic changes of an atrophic brain both in PMCT and autopsy as well as of a typical case of JAD in its advanced stage.

P66 Right Ventricular Rupture Following Open Heart Surgery

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Introduction: The potential complications of cardiac surgery with sternotomy include mediastinitis and major bleeding, events that are infrequent but carry high mortality.

Case presentation: We report a unique complication of median sternotomy. A 71-year-old male with a history of chronic obstructive pulmonary disease underwent coronary artery bypass grafting complicated by sternal dehiscence. One week after discharge he presented with purulent drainage from the sternal wound bed and was diagnosed with mediastinitis. Irrigation, debridement and sternal reconstruction were performed. Two days later, bleeding was observed in the wound, and during surgical exploration a 4-inch tear in the right ventricle was discovered. The patient exsanguinated and died on the operating table. Intraoperative wound cultures showed yeast species and rare *Haemophilus parainfluenzae*. Autopsy findings included focal adhesions connecting posterior sternum to the right ventricle wall, as well as microscopic evidence of focally extensive fatty infiltration along the rupture margin of the myocardium. Cultures obtained at autopsy showed growth of *Pantoea* species from myocardium and rare *Candida parapsilosis* from the muscle flap specimen. Cause of death was right ventricular rupture due to complications of open heart surgery.

Discussion: Pertinent aspects of the case are reviewed, with particular attention to the possible microbial etiology of mediastinal infection and most likely mechanisms of injury contributing to fatal right ventricular rupture. Our case involved two of the strongest known risk factors for development of post-sternotomy infection: postoperative respiratory failure and internal thoracic artery harvesting. Acknowledging that interpretation of microbiological studies in this case is complex and does not allow for a definitive explanation, we evaluate the possibility of true infection with each culture-positive organism and posit, given the limitations, that *H. parainfluenzae* was the most likely pathogen causing mediastinitis, if any identified species was indeed responsible. We detail five of the proposed mechanisms/patterns of injury observed in reviews and case series of right ventricular rupture post-sternotomy, highlighting how these mechanisms may occur in combination to ultimately cause myocardial rupture. Applying the existing literature to our case, we conclude the gross and histologic findings suggest right ventricle rupture as a result of adhesions connecting ventricle wall to posterior sternum ("avulsion" or "pinching" mechanism), focally extensive fatty infiltration at the rupture margin (compromised structural integrity), and possibly ventricle overload and distention due to COPD-related respiratory movement (Valsalva-induced intrathoracic pressure changes). Mediastinitis is also a possible contributor. Limitations are listed and include incomplete reporting received by the treating hospital.

P67 Sudden Unexpected Death in a Child From an Anaplastic Ependymoma.

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Primary central nervous system tumors are an extremely rare cause of sudden unexpected death in children as most patients develop symptoms due to the increased intracranial pressure and are brought to medical attention. Rarely a forensic pathologist may encounter a primary intracranial neoplasm in a pediatric decedent that was not suspected before death. Herein, we present a case of a supratentorial neuroepithelial tumor found at autopsy in a 3 year-old African-American male without significant past medical history. The tumor had significant mass effect and caused cerebral edema which ultimately resulted in transtentorial herniation. The gross, histopathological, immunohistochemical, and ultrastructural findings were most consistent with an anaplastic ependymoma. To our knowledge this the first reported case of sudden unexpected death in a pediatric patient due to this tumor. Although pediatric brain tumors are not commonly encountered in routine

forensic pathology practice it is important to be aware that some such cases may present with unexpected death in connection with seizures, other minor illnesses, and even alleged child abuse that warrant investigation by the medical examiner/coroner system.

P68 Disease Specific Nature of Microglial Neuroinflammation in TBI and CTE

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Chronic traumatic encephalopathy (CTE) is a progressive neurodegenerative disease associated with a prolonged history of repetitive traumatic brain injuries (TBI). Both CTE and TBI are associated with microglial activation. Studies suggest that the natures of microglial activation are different in these two processes; however, this has not been fully explored. By using immunohistochemical analysis with microglial markers, anti-IBA-1 and anti-PGRN antibodies, we compared the microglial morphology, density and distribution in brains of CTE, recent and chronic TBI, and controls including global ischemic injury (GHI) and normal individuals. Increased neuroinflammation, as evidenced by increased IBA-1-positive microglia, was observed—severe in recent TBI and GHI, moderate in CTE, and mild in remote TBI, as compared to the control individuals. The distribution of microglial activation varied in different diseases. In recent and remote TBI, the increased microglial density was localized to injured areas. In CTE brains, microglial activation was observed globally involving the dorsolateral frontal cortex, which is a common location of CTE pathology, and the hippocampus. The brains of GHI showed global microglial activation with the highest density in the CA1 region of the hippocampus. Lastly, microglia show varying morphology in different processes. Ramified microglia were seen in recent TBI and GHI while dystrophic microglia were seen in remote TBI and CTE. Rod like-microglia, which some studies show are related to neurodegeneration, were only seen in CTE cases, both in the dorsolateral frontal cortex and hippocampus. Anti-PGRN antibodies, microglial markers that we recently developed, showed similar patterns of changes to IBA-1. Overall, in CTE there is a sustained, global neuroinflammatory response, while in TBI the neuroinflammatory response appears to be local and transitory. The mechanism of how repetitive TBI switches the neuroinflammation from being focal and temporal to global and chronic needs further study.

P69 Thoracic and Lumbar Nerve Root Hemorrhage in Pediatric Non-Accidental Head Trauma

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Non-accidental head trauma classically associated with that of "shaken baby syndrome" often presents with the triad of subdural hemorrhage, retinal hemorrhage and anoxic encephalopathy; however, in many cases, the children who suffered from non-accidental head trauma are often left on a ventilator leading to respirator brain which often masks histologic evidence of abuse. It is well known that hyperflexion/extension injuries in children lead to hemorrhage in the cervical nerve roots, and this may be the only evidence of possible abuse in a child on a respirator for an extended period of time. In cases with a history of non-accidental head trauma examined at the Cook County Medical Examiner's Office, acute hemorrhage is not only seen in cervical dorsal nerve roots, but is also

seen in dorsal nerve roots at the thoracic and lumbar levels. In some cases, there is only hemorrhage seen only at the thoracic and lumbar levels and not in the cervical region. Such cases highlight the importance of examining all levels of the spinal cord. Additionally, control cases with only global hypoxic/ischemic injury have not shown acute nerve root hemorrhage. Therefore, it is recommended in cases of non-accidental head trauma to evaluate all levels of the spinal cord for evidence of acute hemorrhage.

P70 Death Scene Investigations of Sleep Related Child Deaths, aged 1-4 years, Across Office Systems

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Sudden Unexplained Death in Childhood (SUDC) is the sudden and unexpected death of a child 12 months or older that remains unexplained after a thorough case investigation. SUDC is the 5th leading category of death in children aged 1-4 years resulting in 236 deaths in 2016. While US death scene investigation (DSI) guidelines for sudden unexpected infant deaths were established in 1996, there are no national guidelines for investigating unexplained deaths in SUDC. Documentation of the sleep environment, ideally with doll re-enactment, is a critical component of DSI in sleep related SUDC. The SUDC Registry and Research Collaborative (SUDCRRRC), created in 2014, aims to increase the understanding of the characteristics, circumstances, medical histories and pathologies of children 11 months through 18 years who have died suddenly and unexpectedly, and in some instances, without explanation. We evaluated death scene investigations from 98 cases enrolled in the SUDCRRRC of children who died from 12-48 months from 35 U.S. states. To determine the comprehensiveness of the scene investigation, we examined whether: the scene was investigated, a doll reenactment or interviews were performed, and information about the circumstances of death and medical histories collected. We analyzed these factors across office type. Of the 98 cases, 62 were from ME jurisdictions, 29 Coroner jurisdictions, and 7 Sheriff-Coroner jurisdictions. Scene investigations were performed in 90% (88/98) of cases, but 8 reports were not released for review. Of the 80 DSI reports attained, 91.0% (74/80) described the location as the child's primary home. 97.2% (76/80) were sleep related deaths. 10.5% (8/76) included a doll reenactment. For sleep-related deaths, the environment was described in 82.9% (63/76) cases and the found position of the child was described in 76.3% (58/76) cases. 63.2% (48/76) were in a crib; 3.8% (3/80) were bedsharing. 66.3% (53/80) included caregiver interviews regarding the child's terminal history, 60% (48/80) child's past medical history, and 23.8% (19/80) the family's medical history. While a high rate of death investigations occurred in this series, the comprehensiveness of the investigations reveal gaps and inconsistencies. The low rate of bedsharing and comparably higher rate of children sleeping alone in a crib highlight just some environmental differences between SUDC and SUID/SIDS that warrant the creation of specific national guidelines to best address investigations and promote research of sudden child deaths greater than 12 months.

P71 Death Investigation and Organ Donation Can Coexist

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Death Investigation and Organ Donation, can coexist when communication, collaboration and understanding are present between the Organ Procurement Organization and the Medical Examiner / Coroner. Communication should begin in early stages of the Organ Procurement Organization's evaluation of medical eligibility for patients, especially in circumstances where the investigation could be challenging. This may

warrant a phone or in-person conference among all agencies involved. The goal of this conference should be to ensure that all parties are privy to complete information what tools are available to assist with obtaining a release of Organs. This allows the Organ Procurement Organization to proceed with honoring the individuals wishes to donate and at the same time, assist in obtaining the appropriate tests and information required for the medical examiner/coroner to feel comfortable in releasing. Collaboration is the second key component to allow difficult investigative cases to move forward. When death investigators, Medical Examiner / Coroners, EMS, hospital personnel, the States Attorney, law enforcement, forensic pathologists, and the organ procurement organization work as a team through strong partnership and collaboration we can successfully save lives through organ donation while also completing a successful death investigation. Examples of collaboration include sharing of information, extra blood tests, scans, family dynamics, among many others. A final important component is understanding each other's processes and procedures. By understanding what each party needs to be able to successfully complete investigation and donation, all parties including families of the deceased and recipients will benefit. In conclusion, by following the three steps outlined above we can all work together as a team seeking to understand rather than seeking to be understood, which will be beneficial to all involved.

P72 Thou Shalt Tweet (With Permission): Navigating Legal Guidelines on Social Media Contact

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Background: Forensic pathology is a specialty inherently predisposed to confidentiality, unlike other sub-specialties where the volume of cases may afford easy anonymity. It is important for the forensic pathologist (FP) to respect the confidentiality of the decedent, to respect and maintain the integrity of the judicial process and to protect integrity of police investigations. However once law enforcement and judicial reviews are complete, the decedent's confidentiality must still be protected especially in the age of social media (SoMe). In New Brunswick (NB) Canada, privacy legislation recently changed.

Discussion: Prior to 2009, the usual practice before publication was to obtain the coroners permission to publish. Subsequent to passage of the Personal Health Information Privacy and Access Act (PHIPAA) in 2009, stricter requirements were imposed on handling of patients' personal health information. Today the coroner's permission alone may be insufficient. On September 1, 2010, the Access to Information and Privacy Commissioner's Office was created, with a mandate under PHIPAA to oversee the proper handling of personal health information of living and deceased individuals in the NB health care sector. The Commissioner's role is more relevant since NB has a hospital based forensic practice, with a single payer (Medicare) system, easily accessible electronic medical records and a small population (750,000 by last census).

Under PHIPAA, the FP must follow rules regarding disclosure of individuals' personal health information, including when to obtain consent to publish a case, whether on social media or in peer reviewed journals. Similar privacy considerations apply to the patient in death as in life, unless the decedent has been deceased for more than 50 years and where the personal health information is identifiable. In practice, consent is required when an image or the description of a case can be reasonably attributed to a particular individual by them or their relatives. Consent must still be obtained through the coroner and written consent is ideal. Failure to comply with PHIPAA could result in a privacy breach, an unsolicited

chat with one's head of department or chief of staff, and a complaint to the licensing board.

Conclusion: FPs are constrained by practice to be discreet in what images or case descriptions are published in the public domain. The ease with which SoMe publications can be rapidly and widely disseminated, require the FP to be familiar with the privacy legislation in their jurisdiction and be careful to document consent of the substitute decision maker.

P73 Urological Surgery and Forensic Investigation: Unusual Case Report

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A 44-year-old woman, suffering from left ureteropelvic junction obstruction (UPJO) underwent laparoscopic pyeloplasty. During postoperative hospitalization, the patient had persistent flank pain and CT scan revealed perinephric urinoma, so it was placed a percutaneous nephrostomy tube to drain on the urine, which was removed ten days later. Since the dismissal, the patient complained of continuing intermittent lower back pain and periodical renal colic. CT scan performed two years later demonstrated a linear ribbon like calcification in the left renal basin which was then surgically removed. The pathologic finding was consistent with a retained string which provided a nidus for renal calcification. The patient sued the surgical unit for physical and moral damages, stating that they had negligently left the thread during the pyeloplasty. During the trial, the Judge called in the forensic pathologist to clarify the legal responsibilities of the case. Using a scanning electron microscope and a mass spectrometer analysis (*ME TM 3000 Hitachi - Swift Ed 3000*), the specialist examined a sample of the three most used kind of wire in urology: Monocryl, Vicryl and Prolene. The characteristics of the incrustated thread removed from the patient were compared to the three examined wires in order to establish the urological procedure it came from. The 9 cm calcified exhibit was a monofilament thread, made of 100% carbon. This results lead to the conclusion that the calcified thread was a not absorbable Prolene wire type, typically used in nephrostomy. On the contrary, monocryl and vicryl wires are absorbable suture threads used in pyeloplasty. The most likely scenario was that the prolene string came from the nephrostomy procedure: indeed, when a nephrostomy tube is placed percutaneously, a suture attached to the tube is used during placement and is subsequently cut and removed after it is deployed. Sometimes the string can become tangled or stuck, causing incomplete removal. According to the scientific literature, this is a rare and non-preventable occurrence, certainly not due to the pyeloplasty intervention as the patient claimed. Therefore, the results of the forensic investigations such as electron microscope and mass spectrometer analysis were crucial to exclude malpractice by urologists who performed the pyeloplasty. This case report shows the importance of the figure of the forensic pathologist whose work is essential in some health-related cases of criminal liability.

P74 Caught on Candid Camera: Technology and Medicolegal Death Investigations

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Cause of death in firearm-related deaths is straightforward, with manner of death requiring thorough death investigation. What appears to be a suicide on scene becomes suspicious at autopsy with identification of non-contact wounds or atypical entrance locations. Technology has not only simplified our daily activities, but has also proven to be useful in death investigations, assisting with determination of manner of death.

A suspected self-inflicted gunshot wound to the forehead was reported to the OCME and accepted for autopsy. Circumstances surrounding the

death consistent with a suicide included a secured residence, recent suicidal ideations, significant life stressors and a rifle within close proximity to the decedent. Autopsy determined the entrance wound to the back of the head (occipital scalp) and the wound over the forehead to be an atypical exit wound with a stellate appearance. The hands were bloody with no visible gunshot residues. Based on autopsy findings, manner of death was pending; further law enforcement investigation was requested. Further processing of the scene noted a NEST surveillance camera. Although no footage of the incident itself, the camera captured a still of the victim holding a different rifle to the back of his head. Audio from the camera also captured a phone conversation the decedent had expressing suicidal ideations immediately before the subsequent sound of a single gunshot.

Based on the information gathered from the scene, NEST camera, and autopsy findings it is surmised that the decedent knelt on the ground stabilizing the butt of the rifle on an ottoman with the muzzle resting on the back of his head, which was hyperextended. The decedent would have been able to pull the trigger per arm length (axilla to tip of middle finger) and the length of the rifle (muzzle to the trigger).

In suicides with rifles, the most common location is the head; however, studies show most wounds are to the mouth or temple ([Gunshot Wounds, DiMaio](#)). If the entrance is an atypical location, often times the decedent used or created a prop to assist with the discharge of the firearm. Identification of soot on the hands is helpful; however, not always present and manner of death is determined by scene investigation. In this case, technology was a pivotal tool, which confirmed the manner of death.

P75 Evaluating Efficacy of the 2016 Right to Die Law in California through "Final Exit"-type Suicide by Inert Gas and Exit Bag Cases: An Unexpected Finding

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Background:

Death by plastic bag asphyxiation became increasingly utilized after the publication of the first edition of *Final Exit: the practicalities of self-deliverance and assisted suicide for the dying*. With the publication of the addendum *Supplement to Final Exit* in 2000, which recommended asphyxiation by inert gas, such cases increased in LA County. In 2016, California implemented the End of Life Option Act (EOLOA) which legalized physician-prescribed fatal doses of aid-in-dying drugs to the terminally ill.

Aim:

To determine effectiveness of EOLOA using inert gas cases as a surrogate measure.

Methods:

The department database was queried for cases of suicide by asphyxiation occurring 19 months prior to and after the EOLOA. Cases per month were analyzed using a two-tailed Mann-Whitney U test.

Findings:

33 files were reviewed. 66% were male, 33% were female, with mean age of 44 and a range of 18-75. 11% were completely autopsied. The remaining were externally examined. 73% used helium, 21% nitrogen, 3% unknown gas, and 3% helium/nitrous oxide. 58% noted depression. Resources utilized by the deceased include *Final Exit*, a Frontline episode and the internet, Exit International (x2), suicide instruction websites, and *Five Last Acts - The Exit Path*. Zero cases are terminally ill. No statistical difference is shown between the amount cases prior to and after EOLOA.

Conclusion:

We hypothesized a decrease in deaths by inert gases after passage of EOLOA, which is not supported by the data. Significantly, not one of the decedents is terminally ill. This may explain the lack of effect, as to be eligible for EOLOA you must have a terminal illness. Suicide by inert gas is explained by "Final Exit", a book intended for the terminally ill, and so it appeared to be an appropriate surrogate to follow the effects of a law intended to help the terminally ill. This turns out not to be the case, as none of the decedents in the study are terminally ill, which may have led to the failure of the study to document the effects of EOLOA. The study succeeds in an unexpected area, documenting the unintended use of methods described in the book by those without terminal illness, especially by the depressed (58%). The author states, "there may have been abuse the book..., but misuse has yet to be documented." Our study documents possible misuse, as none of the decedents employing the method were terminally ill, and majority noted depression.

P76 A Retrospective Study of Traffic Fatalities in Taiwan (2007-2016)

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Traffic accident is one of the most common patterns of accidental death in Taiwan, and patterned injuries have distinct pattern that plays a crucial role in traffic-related death investigation. There is a growing concern about driving under illness or medically related condition and urgent attention to elucidate the cause of the accident depend on patterned injuries. In addition to the legislation of driving under influence (DUI) of drug or medication, it still lacks of objective quantitative criteria. In order to clarify the driving impact factors of traffic accidents, guarantee the judicial rights, strengthen quantitative research on forensic evidences, the goal of this study is to conduct an epidemiological analysis of traffic-related deaths and to determine the impact factors of DUI such as alcohol, illicit drugs, prescription drugs, and illness. A 10-year retrospective study was constructed by collecting a total of 2485 (12.6%) traffic accident's forensic fatalities out of 19786 forensic autopsy fatalities from Institute of Forensic Medicine, Ministry of Justice in Taiwan (2007-2016). All traffic-related fatality information was collected and analyzed according to epidemiological investigation. These results demonstrated the manners of death of total 2,485 traffic fatalities were 2320 (93.4%) accidental causes, 83 (3.3%) natural causes, 43 (1.7%) uncertain causes, 20 (0.8%) homicides and 19 (0.8%) suicides. The average age was 52.8 ± 14.6 years old. The age distribution of traffic-related fatalities was skewed towards the aged groups above 60 years old range with the highest occurrences (49.5%) in 2016. The subgroup of the deceased with chronic diseases accounts for 20.1% increasing to 28.5% of total annual traffic-related fatalities from 2013 to 2016. Epidemiological study indicates that 15.4% and 4.3% of all the 280 traffic-related deaths in 2016 are correlated to alcohol and drug respectively. The annual trend within the last decade also shows a declining trend of drunk driving and an increasing trend of driving under illness. The study demonstrated that despite the steady decline of drunk driving, DUI of drug and illness still represent the major causes of traffic accidents. The result can be referenced for the establishment of traffic accident prevention strategies.

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Keywords: Traffic accident, Substance Abuse, Driving under illness, Driving under influence (DUI), Patterned Injury

P77 Study on the Degradation of β -actin mRNA and 18S rRNA in Spleen Cells of Mice after Death

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In this paper, the authors observed the degradation of β -actin mRNA and 18S rRNA in mouse spleen cells under different temperature and constant temperature conditions, and studied the correlation between the Ct values of β -actin mRNA, Ct values of 18S rRNA, Ct ratios of β -actin mRNA to 18S rRNA, relative ratios of fitting Ct value of β -actin mRNA to 18S rRNA, and PMI. 39 mice were sacrificed after cervical disconnection and kept at constant temperature of 10°C, 15°C, 20°C, 25°C and 30°C. From 0h to 72h after death, total RNA in spleen cells was extracted per 6 hours. The cycle threshold (Ct value) of β -actin mRNA and 18S rRNA were detected by Real-time fluorescence quantitative PCR. The results showed that, with the prolongation of PMI, the Ct values of β -actin mRNA and 18S rRNA in different temperature groups showed a linear upward trend. With the prolongation of PMI, the Ct ratio of β -actin mRNA to 18S rRNA in different temperature groups showed a linear downward trend. With the prolongation of PMI, relative ratio of fitting Ct value of β -actin mRNA to 18S rRNA in the temperature group at 10°C and 15°C showed an exponential decrease. And The relative ratio of that in the temperature group at the 20°C, 25°C, and 30°C showed an exponential increase. With the increase of temperature, the results indicated that the relative degradation rate of β -actin mRNA to 18S rRNA appeared to the changes, which from fast to slow. The authors concluded that, under the conditions of different temperature and constant temperature after mice death, the Ct values, Ct ratios and relative ratios of β -actin mRNA and/to 18S rRNA were significantly correlated with PMI, which can be used to infer PMI.

P78 Death Due to Atypical Urinothorax Following Percutaneous Nephrolithotomy: A Case Report

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INTRO

Urinothorax refers to urine in the pleural space and is a rare cause of pleural effusion. They occur secondary to urinary obstruction, trauma, retroperitoneal malignancy, and surgical procedures that produce pleuroretroperitoneal fistulas. Here we present a case of urinothorax secondary to percutaneous nephrolithotomy that resulted in unilateral lung collapse and death. The purpose of this case is to highlight urinothorax as a cause of death, its distinguishing biochemical profile, and its diagnostic features found on autopsy.

CASE REPORT

A 39-year-old female presented to the emergency department with right-sided low back pain and dysuria. Her past medical history was significant for hypertension and recurrent urinary tract infections. An abdominal and pelvic CT showed a large staghorn calculus occupying most of the upper and middle pole caliceal system of the right kidney. After a urine culture revealed a *Proteus mirabilis* infection, the patient was treated with levofloxacin as an outpatient. The patient then underwent percutaneous nephrolithotomy.

On post-operative day (POD) 1, the patient complained of decreased breath sounds and pain with deep inspiration. Chest x-ray revealed increased right pleural fluid. On POD 2, the patient continued to have decreased breath sounds bilaterally. On POD 3, the patient's pain decreased and her nephrostomy tube was removed. However, she

continued to have difficulty breathing and was found apneic later that evening. Resuscitation was attempted but unsuccessful.

Autopsy revealed marked compression and collapse of the right lung associated with a right-sided 1,200 mL pleural effusion consisting of cloudy yellow fluid which smelled like urine. Further examination revealed a surgical track that originated from the posterior chest wall at the 10th intercostal space, went across the inferior pleural cavity, through the right hemidiaphragm, and ended in the upper pole of the right kidney. The primary cause of death was listed as complications of right percutaneous nephrolithotomy, with right urinothorax and collapse of right lung.

DISCUSSION

Urinothoraces as a cause of pleural effusion can be missed clinically due to their perceived rarity and a lack of awareness. They can also be incorrectly classified due to their unusual biochemical pattern including transudative characteristics that deviate from established criteria. Furthermore, cases may differ from the diagnostic criteria, resulting in decreased clinical suspicion. Nevertheless, they can cause respiratory failure and death, as the current case illustrates. Forensic pathologists should be aware of this rare condition.

P79 Causes of Sudden Unexpected Death in Schizophrenia Patients: A Forensic Autopsy Population Study

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Schizophrenia is a detrimental psychiatric disorder, with an increased mortality from natural and non-natural causes. People with schizophrenia have a much shorter life expectancy than in the general population. This study was a retrospective review of autopsy cases of all the individuals with medical history of schizophrenia investigated by the Office of the Chief Medical Examiner (OCME, in the State of Maryland over a 5-year period from 2008 to 2012). The cases were analyzed as to the general characteristic of the individuals; medical history; death scene investigation findings; autopsy and postmortem toxicological findings; and cause and manner of death. Result: from 2008 to 2012, a total of 391 schizophrenia patients were autopsied at the OCME because they died suddenly and unexpectedly. Their age ranged from 15 to 100 years with the mean age of 52 years. Of the 391 deaths, 191 (48.8%) were white, 185(47.3%) were African American, and 15(3.9%) were either Hispanic or Asian. The male and female ratio was 1.5:1. The majority of deaths (N=251, 64.2%) were caused by natural diseases, 47 deaths (12.0%) were accidents, 45 deaths (11.5%) were suicides (11.5%), and 10 deaths (9.7%) were homicides. The manner of death remained undetermined in 38 cases (9.7%). Of the 251 natural deaths, 198 cases were due to cardiovascular diseases (50.6%). Atherosclerotic cardiovascular disease, hypertensive atherosclerotic cardiovascular disease and hypertensive cardiovascular disease were the primary diagnoses of cardiac deaths (169 in total, 85.4%). Cause of death was listed as cardiac arrhythmia in 11 cases. This diagnosis of cardiac arrhythmia was made based on postmortem scene investigation (sudden death with no evidence of suspicious), review of medical history (no history of any other medical diseases), complete autopsy with no identifiable macroscopic and microscopic abnormal findings, and negative toxicological tests. Of the 11 cardiac arrhythmia deaths, 7 patients were less than 40 years of age. Drug intoxication was the second most common cause of death in our study group (50 cases, 12.8%). In conclusion, the study shows high fatality caused by cardiovascular diseases and drug intoxication among schizophrenia patients, which calls attention of the medical community to closely monitor the high risk factors of sudden death among schizophrenia patients.

P80 A Fatal Case of Pulmonary Lymphangitic Carcinomatosis of Colonic Origin Masquerading as Interstitial Lung Disease

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Pulmonary lymphangitic carcinomatosis (PLC) is a unique subtype of metastatic malignancy with diffuse lung lymphatic invasion. PLC is uncommon, comprising 6-8% of lung metastases. The most common primary carcinomas associated with PLC include breast, colon, stomach, and pancreas. Importantly, PLC may be mistaken clinically and radiologically for interstitial lung disease, especially in young patients without suspicion for cancer. This is problematic, as the prognosis for PLC is very poor, with a three-month post-presentation mortality rate of approximately 50%. We present a case of a young woman with colon cancer and pulmonary lymphangitic carcinomatosis misdiagnosed as interstitial lung disease, which eventually led to her death.

A 36-year-old female with a history of type 2 diabetes mellitus, obstructive sleep apnea, and morbid obesity presented with 1 month of worsening shortness of breath and nonproductive cough, which progressed to respiratory failure requiring intubation. CT showed diffuse interlobular septal thickening and ground glass opacities, as well as mediastinal and retroperitoneal lymphadenopathy, which was interpreted as reactive. Given her symptomatology and imaging, she was diagnosed with interstitial lung disease. After no improvement with systemic steroids, she underwent open right lung biopsy, which unexpectedly showed metastatic colon adenocarcinoma. Unfortunately, the patient's respiratory failure progressed rapidly, and she expired before further work-up could be performed.

Autopsy revealed a large cecal mass, which histologically showed high-grade mucinous adenocarcinoma invading through the muscularis propria. Extensive lymphovascular invasion was seen. Mismatch repair protein expression was intact by immunohistochemistry. The lungs displayed diffuse lymphangitic carcinomatosis from metastatic colon adenocarcinoma. There was also diffuse lymphadenopathy, confirmed histologically to be involved by metastatic colon adenocarcinoma. No other sites of metastatic disease were found. Other incidental autopsy findings included a right ovarian mature cystic teratoma. The cause of death was reported as end-stage invasive high-grade mucinous adenocarcinoma (pT3 N2b M1b [Stage IVB]), with widespread lymph node involvement and diffuse metastatic PLC.

In summary, our case describes the findings of PLC at autopsy, and highlights the dangerous capacity of PLC to mimic interstitial lung disease, leading to significant delays in diagnosis and increased patient morbidity and mortality.

P81 Multi-Analytical Screening of Drugs of Abuse and Creatinine from a Single Urine Sample in Less than Twenty Minutes with the Fully Automated Biochip Analyser Evidence MultiSTAT

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Background. During the drug testing process, a reliable and rapid screening step is important. Furthermore, a multi-analytical approach increases the screening capacity and provides more information from a sample. Urine is the testing sample of choice for many drug tests. Biochip array technology allows the simultaneous detection of multiple drugs of abuse (AB-PINACA, alpha-PVP, amphetamine, barbiturates, benzodiazepines, benzoylecgonine/cocaine, buprenorphine, ETG, fentanyl, JWH-018, 6-MAM, methadone, methamphetamine, opiate, oxycodone, THC, tramadol, UR-144 and creatinine) from a single urine sample in less than twenty minutes when applied to the biochip analyser

Evidence MultiSTAT. The application reported in this study represents a useful multi-analytical tool for the toxicological analysis.

Materials and methods. The core of the technology is the biochip (9mm x 9mm) which represents not only the platform on which the capture ligands are immobilized and stabilised, defining microarrays of discrete test sites, but also the vessel in which the simultaneous immunoreactions are performed. Simultaneous chemiluminescent immunoassays were employed and applied to the analyser Evidence MultiSTAT. This fully automated system processes a self-contained cartridge containing all the components required for the immunoassay reactions and has the capacity to assess two biochips in under 20 minutes. Sampling 25µl of urine against a cut-off sample, the results obtained are qualitative. The cut-off values ranged from 1 ng/mL (buprenorphine) to 750 ng/mL (ETG). The cut-off value for creatinine was 20 mg/dL.

Results. The evaluation of the repeatability (replicates +50% of the cut-off and -50% of the cut-off) and accuracy (50 negative and 50 spiked samples spanning the cut-off) showed percentage agreement of >90% for all assays. The multi-analytical screening of 30 authentic samples showed the following percentage agreement with LC/MS: 100% (6-MAM and oxycodone), 97% (benzodiazepines, methadone and opiate), 93% (amphetamine, buprenorphine, methamphetamine and THC) and 80% (benzoylecgonine/cocaine). All samples screened positive for the presence of creatinine indicating that no sample dilution had occurred.

Conclusion. Data indicate optimal analytical performance and applicability of biochip array technology to the rapid (less than 20 minutes) simultaneous detection of multiple drugs of abuse and creatinine from a single urine sample, when applied to the Evidence MultiSTAT. This system represents a reliable and quick multi-analytical screening tool for a wide range of substances, which facilitates the process in toxicological analysis.

P82 Green-Blue Organs at Autopsy

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We report an interesting gross pathology finding of green-blue organs at autopsy of a 67-year-old female who died of septic shock after surgical perforation of the small bowel. A review of the medical record revealed administration of methylene blue to treat the patient's hypotension due to septic shock. Methylene blue has been used as an adjunct therapy in cases of refractory vasoplegic shock due to sepsis. On gross examination, the cardiac muscle turned a bright green-blue color after exposure to air. Histologic examination failed to show abnormal pigmentation of the tissues. In the presence of oxygen, methylene blue metabolite is oxidized to methylene blue resulting in the organ discoloration at autopsy. Methylene blue should be considered in any case of blue-green discoloration of organs.

P83 .40 Caliber Bullet Embolization: A Case Report

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Introduction

Bullet emboli are infrequent occurrences of penetrating gunshot wounds; however, the frequency with which such cases occur have been increasing. Typically, bullet embolization occurs with small caliber bullets. I report on a case of a large caliber bullet which embolized in the abdominal aorta from a penetrating gunshot wound to the right shoulder.

Case Report

A 21-year-old male was shot standing on the front stoop of his home. He retreated into the home and collapsed in the living room. Postmortem

examination disclosed an entrance wound on the right shoulder and no exit wound. Fragments of the projectile were recovered from within the fractured humerus. Full body imaging revealed a projectile within the abdominal cavity. Internal examination showed no hemorrhage or perforating defects in the abdominal cavity. It was at this point that a bullet embolus was considered. After evisceration, the .40 caliber became visible within the abdominal aorta, superior to the bifurcation of the iliac arteries. The bullet passed through the skin and subcutaneous tissues of the right shoulder, right humerus, anterior 3rd rib, right lung, right pulmonary vein, left atrium, left ventricle and into the aorta. The large caliber bullet traveled away from the heart through the arterial circulation to its final site in the abdominal aorta, superior to the bifurcation of the iliac arteries.

Discussion

The first report of foreign body embolization was in 1834. Arterial bullet embolism is an uncommon, but well-recognized phenomenon. Literature reviews suggest smaller bullets and low-velocity missiles usually cause embolism as a result of residual kinetic energy causing penetration, but not perforation of heart chambers or blood vessels. Large caliber bullets rarely embolize. This case describes the finding of arterial bullet embolization involving a large caliber bullet. Arterial emboli occur following injuries to the pulmonary vein, heart, aorta, or large arteries. Lower extremity embolization is more common than upper extremity embolization. Bullets in the lower extremity tend to go to the iliofemoral system. The large caliber bullet in this case lodged just above the bifurcation of the iliac arteries because its size prevented it from traveling any further.

Conclusion

Bullet emboli usually occur with small caliber bullets. However, large caliber bullets are also capable of embolizing. This case report emphasizes this rare occurrence and highlights the importance of embolization of larger caliber bullets involving penetrating gunshot wounds.

P84 When Water Kills: A Fatal Case of Psychogenic Polydipsia

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Psychogenic polydipsia is characterized by excessive water intake in the absence of physiologic stimulus to drink. Its prevalence is 3%-39% in the psychiatrically disabled population. It may result in self-induced water intoxication (WI), leading to consequences such as rhabdomyolysis, compartment syndrome, acute renal failure, seizures, coma and even death.

The authors present a case in which the death was attributed to WI. A 40-year-old male was found dead in the assisted living facility where he resided. There was no evidence of alcohol or illicit drug use on the scene. His history included schizophrenia, polysubstance abuse, recurrent psychogenic polydipsia, post-traumatic stress disorder and prior suicide attempts.

A postmortem examination was performed at the Denver Office of the Medical Examiner. The body, normally developed and overnourished (BMI 33.8 kg/m²), showed evidence of recent minor trauma, including a bite mark on the tongue.

The internal examination revealed cerebral edema (brain weight 1740 grams); enlargement of the heart (500 grams) with patent coronary arteries; crepitant lungs with edematous parenchyma; and enlargement of the liver (3080 grams). The histological examination highlighted congestion and diffuse vacuolation of neuropil; cardiac myocyte hypertrophy and interstitial fibrosis; congestion and intra-alveolar edema

on the lungs; and severe macro- and microvesicular hepatic steatosis. The analysis of the vitreous electrolytes revealed hyponatremia (sodium 120 mmol/L, chloride 94 mmol/L). Blood toxicological analysis was positive for 9-Hydroxyrisperidone (Risperidone metabolite) within therapeutic range, Naloxone, Delta-9 THC and Cotinine.

Based on the examination findings and history, the cause of death was attributed to hyponatremia with probable seizure due to probable psychogenic polydipsia with WI due to schizophrenia. Significant contributing conditions included chronic substance abuse, obesity, cardiomegaly and hepatic steatosis. The manner of death was natural. Lethal cases of WI have been described in situations such as excessive fluid intake in athletes or soldiers during physical training, fatal child abuse by forced water ingestion, or compulsive liquid intake in chronic alcoholics with behavior disorders.

Few literature reviews concern cases of psychogenic polydipsia resulting in death. However, even in the absence of witnesses of ante-mortem excessive liquid intake, WI must be included in the differential diagnosis of unexplained death among psychiatric patients. As there are no pathognomonic autopsy findings, the pathologist must carefully integrate clinical, toxicological and autopsy evidences to achieve the proper diagnosis. In accordance with the literature, postmortem vitreous humor hyponatremia is strongly supportive of the diagnosis of death due to WI consequences.

P85 Clinicopathologic Features of Acute Esophageal Necrosis, A Case Series

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Acute esophageal necrosis (AEN) is a rare condition characterized grossly by circumferential, black, distal esophageal mucosa with abrupt transition to normal mucosa at the gastroesophageal junction. Studies published in clinical literature describe AEN as a marker of severe comorbid illness rarely causing death. Few cases have been described in forensic literature, excluding patients who die prior to hospitalization from consideration. Therefore, the mortality of AEN (and risk factors associated with a fatal outcome) may be unrecognized. To date, the largest case series in the forensic literature includes 5 cases. We present 8 cases with complete investigation and autopsy to further document the clinicopathologic findings of AEN in the forensic setting.

A retrospective review of cases from the Vermont Office of the Chief Medical Examiner (VOCME) was performed from January 1, 2007 to May 1, 2018. Cause and contributory cause of death and final pathologic diagnoses were searched in the case database for AEN and necrotizing esophagitis.

During the study period, 4,771 autopsies were performed at the VOCME. Eight cases of AEN (incidence of 0.17%) were identified. There was a male predominance (75%). Average age was 57 years (range of 43-80 years). Medical history was significant for the following: cardiovascular disease (5; 62.5%), diabetes mellitus (4; 50%), alcohol abuse (4; 50%), venous thrombosis (1; 12.5%), and breast carcinoma (1; 12.5%). Alcohol was present in postmortem blood in 3 cases (37.5%). History of vomiting or abdominal pain in the days preceding death was noted in 3 cases (37.5%). Evidence of gastrointestinal hemorrhage was identified in 6 cases (75%). Circumferential black esophageal mucosa was limited to the distal half of the esophagus in 6 cases (75%) and extending into the proximal half in 2 cases (25%). Esophageal varices were not identified in any case. Histologic evaluation revealed necrosis and acute inflammation limited to the mucosa and submucosa. No histologic evidence of microthrombi, viral cytopathic changes, fungal elements, or bacteria were

identified. AEN was listed as the cause of death in 2 cases (25%) and as a mechanism of death in 4 cases (50%).

Comparing our findings to those reported in clinical literature, we found our patients to be younger (57 years vs 67 years) and to have a higher prevalence of alcohol abuse (50% vs 10%). Additionally, AEN identified at forensic autopsy was more likely to be listed as the underlying cause of death (25%) compared to hospitalized patients dying from AEN (6%).

P86 Accidental Opioid Drug Overdose Death Trends in Oklahoma, 2002-2016

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Background: The national opioid crisis is of increasing public concern. Although accidental overdose deaths remain a critical public health concern for Oklahoma, trends incorporating recent data regarding fatal accidental opioid-related deaths are not well known. The aim of this study was to identify and quantify temporal trends of opioid-related overdoses for Oklahoma and to compare them nationally.

Methods: Oklahoma Medical Examiner data from 2002-2016 that included all accidental manners of death in which drugs (individually or in combination) were either the sole cause of death or contributed to death was compiled. For this study, data analysis was limited to opioids that were stratified into the following categories: Prescription opioid pain relievers (morphine, oxycodone, hydrocodone, oxycodone, hydromorphone, codeine, methadone, meperidine, and propoxyphene), synthetic opioids (fentanyl, fentanyl analogs, and tramadol), and heroin.

Results: There were 9121 total overdose deaths with an overall 2.7-fold increase from 2002 (306 cases) to 2016 (834). Opioids were involved in 81% (7378) of overdose deaths. A 3.3-fold increase was observed from 2002 (203) to 2009 (677) when a peak occurred; a 2.5-fold increase was observed over the entire study period. Prescription opioids pain relievers (6211) were involved in 68% (6211) of cases, showed a 3.1-fold increase from 2002 (183) to a peak in 2009 (561), and had an overall 2.0-fold increase. Synthetic opioids were involved in 10% (951) of cases, showed a 9.3-fold increase from 2002 (11) to a peak in 2009 (102), and had an overall 8.0-fold increase. Heroin (216) accounted for only 3% of all opioid overdoses and continued to trend upward over the duration of the study period with an overall 5.3-fold increase. (9 in 2002; 48 in 2016).

Conclusion: Nationwide data from the National Institute on Drug Abuse from 2002-2015 showed a 2.2-fold increase in overall drug overdose deaths with a 2.8-fold increase in all opioids, a 1.9-fold increase in prescription opioids, a 7.4-fold increase in synthetic opioids, and a 6.2-fold increase in heroin. Prescription opioid pain relievers did not show substantial increases nationally in recent years (1.1-fold increase from 2011-2015). With the exception of heroin, there were greater overall increases in opioid-related deaths in Oklahoma, with a peak occurring in 2009. Nationally, synthetic opioids are the fastest growing (3.3-fold increase from 2013-2015) and most common drug in overdose deaths (31% in 2016); in contrast, there has been no significant increase in recent years for the state of Oklahoma.

P87 Preliminary Investigative and Pathological Findings in The North American SUDEP Registry (NASR)

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Introduction: Sudden unexpected death in epilepsy (SUDEP) is responsible for the second highest number of lost potential life-years of any neurological disease. Generalized tonic-clonic seizures (GTCS) precede most SUDEPs, and post-GTCS state is associated with impaired arousal and protective reflexes as well as autonomic disorders, including

apnea and arrhythmia. Post-mortem investigations demonstrate strong correlations between SUDEP and death being unwitnessed, with most decedents discovered in the prone position. In studies hypothesizing pathological changes in SUDEP, autopsies frequently note focal neuronal loss and gliosis, and mild myocardial interstitial fibrosis. However, these findings are incredibly subtle and require further analysis to tease apart those that may cause SUDEP from indicators that result from the underlying epilepsy disorder itself. This study provides a large-scale, robust database for the study of tissue and postmortem reports for 250 confirmed SUDEP cases.

Methods: From June 2011 – March 2018, the North American SUDEP Registry (NASR) enrolled presumed SUDEP cases, deceased controls with epilepsy, living epilepsy controls and living first-degree relatives of decedents. SUDEP was classified and adjudicated using Nashef (2012) criteria.

Results: We identified 250 SUDEP cases, with a median age of 26 years [range 1-70 years]. Death was witnessed in 9% (n=22/250) of cases. Among the unwitnessed deaths, 50.4% (n=126) were found prone and 51.2% (n=128) had evidence of a terminal seizure (tongue/cheek bite, incontinence, etc.). Cardiopulmonary resuscitation was performed on 47.6% (n=119) decedents upon discovery. 68.4% (n=171) had a full autopsy. Tissue and/or DNA was obtained for NASR in 154 SUDEP cases. Medical examiner scene investigation reports, autopsy reports, and medical records were obtained for 171 cases. Whole brain neuropathology examinations were performed by NASR for 28 decedents, with 25 (89%) demonstrating epilepsy-specific pathological changes; most commonly gliosis, focal dysgenesis of the dentate gyrus, and focal cortical dysplasias type I/IIA. Of these, the median brain mass was 1411g [IQR 1270-1540]. Among autopsied SUDEP cases, 58 (34%) had pulmonary edema.

Discussion: The median age, seizure history and death circumstances in our 250 NASR cases were similar to those in prior population and clinic-based studies, suggesting that the SUDEP cases enrolled in NASR are representative of some of the diverse aspects of SUDEP presentation. Analysis of the materials collected through the registry will allow us to draw generalizable conclusions about SUDEP mechanisms. We aim to make NASR available to qualified researchers studying SUDEP and epilepsy to accelerate understanding of this devastating consequence of epilepsy.

P88 Gabapentin in Association with Opioid Deaths

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Gabapentin is a drug first approved for use in the United States in 1993 as a treatment for seizures and neuralgic pain associated with shingles. It is one of the most prescribed medications, ranking 10th in 2016 per a paper published in the New England Journal of Medicine, and ranking ninth in 2017, according to the prescription tracker GoodRx. It has generally been considered of low potential abuse. However, in the state of Kentucky, Louisville office, gabapentin was reported in nearly 1/4 of all overdoses, prompting legislation to classify the drug as a controlled substance. This retrospective review spans all of the forensic cases that had toxicology testing performed at the direction of the Palm Beach County Medical Examiner Office (district 15) over a five year period, spanning from January 1, 2013 to December 31, 2017. We will also provide a snapshot of data of the first 6 months of 2018.

Initial review of the data shows that in the years 2013 and 2014, an average of 43 cases per year were positive for gabapentin, with cases certified as some form of acute drug toxicity comprising approximately half of the cases positive for gabapentin. In 2015, we saw a marked increase in the number of cases that were positive for gabapentin, more than double the previous baseline years average of 43, and by the end 2016, more than triple the baseline number. In 2017 we saw a minimal decrease in the total number of cases, however, the proportion of cases having gabapentin and certified as some form of acute drug toxicity increased, so that the approximately 75% of the acute overdose deaths have gabapentin in the blood. The decedent demographic has also been noted to be young adults, and an effort will be made to track data of actual gabapentin prescriptions in cases where the medical information is available.

Amid the opioid epidemic that has affected our county in an exceptional manner, following the number of opioid with gabapentin deaths is also of public health interest. On possible recommendation might be to include gabapentin in cause of death statements, since a study published in *Addiction* in 2017 has noted decreased tolerance or increased risk of respiratory depression with concomitant use of opioids and gabapentin.

P89 Occult Cardiac Amyloidosis: The Last Chapter Of A 5-Year Long Story

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Amyloidosis is a disease characterized by deposition of amyloid protein in tissues throughout the body. Of the more than 20 forms identified, the three most common types are amyloid light chain (AL), amyloid associated (AA), and amyloid beta (Ab). The prognosis depends on where in the body amyloid deposition occurs, the amount of deposition, and the symptoms. Cardiac involvement is commonly associated with the AL amyloidosis, characterized by diastolic cardiac failure and conduction system abnormalities. The most common presentation is a restrictive cardiomyopathy secondary to myocardial infiltration of amyloid protein that results primarily in diastolic dysfunction; in this group, sudden death can occur. Autopsy studies have demonstrated the rate of undiagnosed amyloidosis at death to be approximately 1–4% [1 - 2].

A case of a 53-year-old man's death due to unsuspected, undiagnosed primary amyloidosis, predominantly involving the myocardium, is reported. In 2014 the man complained gastroenterological symptoms with severe weight loss. In March 2015 an electrocardiogram (ECG) showed signs of sub-epicardic ischemia; gastroenterologic study showed chronic colonic inflammation, gastritis, and reflux esophagitis. In August 2015 he was admitted to hospital with the diagnosis of colitis and chronic obstructive pulmonary disease. In September 2015 episodes of angina pectoris occurred, with signs of biventricular hypertrophy and diastolic dysfunction at ECG and echocardiogram; coronography showed an intramural left anterior descending coronary artery. At the discharge, diagnosis of angina abdominis was formulated. In March 2016 a brain stroke with left hemiparesis occurred; ECG showed low peripheral voltages with increase of troponin; echocardiography showed bi-ventricular hypertrophy with pericardic effusion. Monoclonal gammopathy was also found. In July 2016 a bicameral implantable cardioverter-defibrillator was implanted because of a progressive cardiac failure, but a cardiogenic shock occurred leading to death.

Post-mortem histologic examination demonstrated amorphous eosinophilic extracellular material suggestive of amyloid in lymph nodes, lungs, liver, spleen, kidneys, adrenal glands, stomach, and heart. This material stained positive with Congo red; "apple green" birefringence was

observed under polarized light. Massive subendocardial deposition of amyloid as well as in the walls of intramural arterial branches of the heart associated with myocyte degeneration, were found in the myocardium. The cause of death was progressive heart failure secondary to amyloid protein infiltration of the heart, due to underlying primary systemic amyloidosis.

This case illustrates that amyloidosis should be considered within the differential diagnoses, and actively investigated in patients with unspecific and long-lasting symptoms.

P90 Reconstruction of Vehicle-human Crash Accident and Injury Analysis Based on 3D Laser Scanning, 3D Motion Capture and Multi-rigid-body Reconstruction

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The aim of the present study was to reconstruct and analysis of the vehicle–bicycle–humancrash accident by using multi-rigid-body dynamics combined with an optimization method (genetic algorithm), three-dimensional (3D) laser scanning technology and 3D motion capture. First, a FOCUS 3D high precision laser scanner was used to measure the vehicle and bicycle. Second, a 3D motioncapture system was used to analyze coupled motions of a volunteer while walking and cycling. The motioncapture results were used to define the posture of the human model during walking and cycling simulations. Then, cyclist, bicycle and vehicle multi-rigid-body models were developed. Pre-impact parameters of the models were treated as unknown design variables. Finally, a multi-objective genetic algorithm, the nondominated sorting genetic algorithm II, was used to find optimal solutions. In the most closely matched result found, all observed contact points matched and the injury parameters correlated well with the real injuries sustained by the cyclist. Based on the real accident reconstruction, the present study indicates that multi-rigid-body dynamics combined with an optimization method (genetic algorithm) and 3D laser scanning technology, can be used to reconstruct the vehicle–humancrash accident, help the legal examiner to identify the pre-impact conditions of a cyclistinvolved in a vehicle–bicycle accident, provide more information about the causes of specific injuries, including the impact locations and the forces involved, which has application value in forensic medical identification of the traffic accidents.

P91 Gunshot Wounds: Misinterpreting the Mimickers

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Deaths related to gunshot wounds are abundantly common across the United States. In 2016, in the Commonwealth of Virginia, gun-related deaths accounted for greater than 1,000 of the violent deaths investigated by the OCME. To further elaborate on that number, 58% of all suicides in 2016 and 78% of all homicides were committed using a firearm. So accustomed are we to spotting such telltale circular defects that we risk misinterpreting wounds that are something else entirely. Given the number of gun-related deaths in the forensic world, could it be possible to simply accept a circular defect at face value when it is, in fact, only a mimicker? We present two cases in which such defects may have been easily misinterpreted without sufficient investigation and analysis.

Case 1: A 32-year-old white male was reported missing by his roommate after having not been seen for two days. Three days after the Missing Persons Report was filed, the subject's body was found in a heavily wooded area off of the Appalachian Trail. He was partially suspended from a tree by way of a rope fashioned into a noose. All circumstances

surrounding the case were consistent with a suicide. There were no overt signs of injury, but mild decomposition was noted, to include skin discoloration, drying artifact, and fly activity. At autopsy, in addition to a red-brown, dried furrow matching the rope's pattern, multiple round defects of the skin and underlying subcutaneous tissues were noted on the face, neck, and torso. Initially misinterpreted as gunshot wounds, further investigation revealed that the defects were postmortem holes created by carrion beetles.

Case 2: A 52-year-old black male was the restrained front passenger involved in a three-vehicle motor vehicle accident on I-95. Both driver and passenger were pronounced dead on scene. During the subsequent postmortem examination at the OCME, a 1/2" x 3/8" ovoid penetrating wound was noted on the right side of the lower back. Initially misinterpreted as a gunshot wound, further investigation revealed that this was a puncture wound caused by a piece of protruding metal from within the vehicle of interest.

The cases are presented along with a discussion regarding the importance of the initial scene investigation, subsequent re-visitation of death scenes and death scene photographs, and of course, radiography and a thorough internal postmortem examination.

P92 A Potpourri of Pills: A Case Report of a Fatal Oxcarbazepine Overdose

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Oxcarbazepine (Trileptal®) has been used as an anticonvulsant since 1988. Oxcarbazepine (OCBZ) is biotransformed via reduction to 10-OH-carbazepine (10HCBZ), a pharmacologically active metabolite that provides most of the anticonvulsant potency. Used alone or in combination with other anticonvulsants, OCBZ induces microsomal enzymes of the P-450 family, and is reportedly well tolerated with other drug classes with the exception of macrolide antibiotics. Fatal overdoses with OCBZ alone have been reported, and higher concentrations of OCBZ have been reported in combination with other medications.

Here, we describe the case of a 28-year-old male whose death was due to a fatal OCBZ overdose in combination with codeine. The decedent was an active duty U.S. Army Sergeant who expressed feelings of extreme job stress to his supervisor. He was at home on approved leave, and while his family was out of the house, apparently took multiple prescription and non-prescription medications. He was found unresponsive and not breathing; he was pronounced dead at the scene by the local coroner. At autopsy, the non-specific findings of visceral congestion and cerebral edema were noted; pill fragments were present in the gastric contents. Postmortem testing of the iliac blood showed a toxic level of codeine (>0.75 mg/L), a therapeutic level of morphine (0.034 mg/L, metabolite), a fatal level of OCBZ (34 mg/L), and a very high level of 10HCBZ (70 mg/L). Other medications present in the blood but not quantified: Diphenhydramine, (pseudo)ephedrine, fluconazole, fluoxetine, guaifenesin, methocarbamol, nordiazepam, promethazine, and propranolol. The manner of death was determined to be suicide.

Although the scene had probably been altered by the family prior to the arrival of the investigating officer and the coroner, the combination of medications present in the blood are indicative of the decedent taking other family members' medications that were readily accessible. This case also suggests that fluconazole can also raise OCBZ and 10HCBZ to lethal levels when taken together.

P93 Death by Electric Power Drill: A Case Report and Review of Current Literature

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Introduction: Although penetrating injuries of the head are all too common in a forensic setting, those caused by an electric power drill are exceedingly rare. The presence of two penetrating injuries of the head caused by a power drill is even rarer. The following is a case report and review of the literature regarding the certification of a self-inflicted death due to injuries caused by a power drill.

Case History: A 68-year-old man was found unresponsive on the floor of his garage with two defects on either side of his head. He was pronounced deceased at the scene by emergency personnel. A scene investigation by law enforcement revealed no firearm; was significant for a suicide note, tissue within a drill bit of an electric power drill, and an internet search history of "how long it take to bleed out drilling a hole in your head" on a personal computer.

Findings: The postmortem examination revealed an ovoid 1/2 x 3/8 inch wound of the right lateral head and a circular 3/16 inch wound of the left lateral head. The penetrating injury from the right caused a defect in the sphenoid bone without beveling; the drill bit penetrated into bone of the right middle cranial fossa without significant cerebral injury. The penetrating injury from the left caused a defect between the sphenoid and temporal bones without beveling; the drill bit penetrated into the left temporal and parietal lobes with resultant subdural, subarachnoid, intraparenchymal, and intraventricular hemorrhages.

Discussion: A search of the Oklahoma Medical Examiner database (2000 to 2018) revealed no cases of death secondary to a power drill. A review of the literature finds only nine cases of death secondary to power drills published since 1982. A reason for this scarcity of published cases, at least in regards to head injuries, may be that power drills have the potential of causing deep penetration into brain tissue without necessarily being lethal. This is partially demonstrated in this case by the fact that two penetrating injuries occurred before death. One of the most important aspects of these cases for the forensic pathologist is that external examination findings may be easily mistaken for gunshot entrance wounds, to include the mimicking of a muzzle imprint. A thorough investigation and internal examination of wound tracks are necessary to differentiate the two from each other and to prevent injury misinterpretation that may cause subsequent investigative and legal complications.

P94 Study of the Test for Postmortem C-Reactive Protein in Routine Autopsy Practice

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C-reactive protein (CRP) is an acute phase response protein synthesized in the liver as a response to various inflammation. CRP is extensively used as a general marker for inflammation in clinical medicine. A forensic applications of the CRP using postmortem samples have been studied in oversea. We have compared CRP in the between antemortem and postmortem samples and studied stability of postmortem blood samples for CRP test. In 69 consecutive autopsy cases, we have analysed heart blood samples (69 cases), peripheral blood samples (33 cases), and vitreous humor samples (60 cases). Postmortem CRP was elevated in 25 cases (36.2%) and possible causes of CRP elevation were inflammatory disease except one case (unknown). Postmortem CRP test shows sensitivity 86.7%, specificity 80%, positive predictive value 92.9%, and negative predictive value 66.7% for inflammation based on 20 cases with

antemortem CRP results. The postmortem CRP levels were similar in the heart blood samples and peripheral blood samples. Vitreous humor samples are not useful in postmortem CRP testing. And both whole blood and serum samples are stable in room temperature until 31 days. We conclude that serum from heart blood is best suitable sample for postmortem CRP test and postmortem CRP test is useful in routine autopsy practice to detect inflammatory disease such as sepsis. From the view of postmortem point, we desire that this valuable test should be used in routine autopsy practice in Korea. Key Words: Autopsy; C-Reactive protein; Forensic medicine

P95 Distance and Everything in Between: Importance of Correlation of Thorough Scene Investigation and Autopsy Findings in Determining Range of Fire.

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Death by firearm accounts for approximately two-thirds of all homicides in the United States. Range of fire is the distance between the firearm and the victim when the weapon is discharged. We discuss a case where a victim was shot while driving his vehicle and examination of the body showed multiple wounds over the back.

Police reported that a 23-year-old Hispanic male was shot in the back by a semiautomatic rifle while on-the-job. The decedent was injured, inside his tow truck, while repossessing the assailant's vehicle. On scene, the assailant confessed to police that he shot the decedent after being involved in a verbal confrontation with the decedent. The cartridge casing was never recovered to determine the exact range of fire; however, the investigation suggested that he was shot once from a distance of greater than 100 feet. The decedent's work vehicle was still running and in gear, on the side of the road within brush when police found him. There was no damage to the vehicle from a potential car wreck.

The Medicolegal Death Investigator responded to the scene and identified a single bullet hole behind the driver's side door. Within the vehicle, the decedent was seated in the driver's seat and slumped over the center console with identification of a defect within the driver seat and seatbelt. Examination of the body on scene showed multiple wounds to the left inferolateral scapular region with embedded metallic fragments surrounded by black foreign residues. There was no evidence of significant blunt force trauma sustained in the incident.

Autopsy confirmed the scene findings of a fragmented bullet with recovery of multiple jacket and bullet fragments and documentation of injury to the left lung, heart, and great vessels. Gross and microscopic examinations of the wounds showed black foreign residues deposited on the skin with the appearance of soot; however, examination of the t-shirt by the crime laboratory showed the presence of lead residue only. These findings are consistent with vaporized lead caused by the bullet perforating an intermediary target, which can simulate soot.

In this case, accurate determination of range of fire was crucial to the police investigation as the assailant claimed that he tripped and fell causing the firearm to discharge. Without scene documentation of a single defect within the exterior of the car, one might come to the erroneous conclusion that the decedent was shot multiple times and from close range.

P96 Pulmonary Fat Embolism during Cemented Arthroplasty

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Bone cement implantation syndrome is well described clinically in patients undergoing arthroplasty. Hemodynamic deterioration of varying degree of

severity occurs in 25-30% of patients undergoing cemented arthroplasty. Perioperative mortality due to this syndrome has been reported to be as high as 2%. Pulmonary embolization, complement activation, anaphylaxis, and release of histamine have been postulated as the underlying pathophysiology.

An eighty-eight year woman underwent revision of left cemented knee arthroplasty for lower femoral fracture. Following application of bony cement to the femur, she became bradycardic, hypotensive and hemodynamically unstable; resuscitation was unsuccessful and died intraoperatively.

Autopsy showed hypertensive cardiovascular disease, severe arteriosclerotic cardiovascular disease, mitral and aortic valve stenosis. No gross pulmonary emboli were present. Microscopic examination showed numerous vacuoles in the pulmonary small blood vessels and capillaries on H & E stain. The fat emboli were confirmed by Oil red O stain.

P97 Unintentional Partial Preservation of Remains, Did You Say Lye or Lime?

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We present a case of the remains of a 44-year-old man found buried approximately 43 inches deep several years after he was originally reported missing. A forensic archeological examination of the scene and an anthropological examination of the remains were carried out. Two conditions promoted partial preservation of the remains. The first was the surrounding compact wet clay soil. The second was that the contents of several bags of agricultural lime had been deposited on top of the body which effectively assisted in preservation by neutralizing the acidity of the surrounding soil and promoting saponification. The internal organs were markedly decomposed. However, injuries including several perforations of the heart consistent with wound tracks were identified. Six projectiles were also recovered from the body. A spontaneous type of postmortem change known as saponification delays and alters the normal process of decomposition. Alkali and wet burial environment promote saponification. A variant of saponification is post-mortem hydration and dehydration of body fats that forms a grayish-white greasy substance on the surface of the skin known as adiopocere.

P98 Do Toxic Adulterants in Street Drugs Contribute to the Cause of Death in Drug Users?

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Illicit drugs sold at the street level have been mixed with pharmacologically active substances. These adulterants may contribute to the toxic effect profile of the drug.

The objective of this presentation is to raise awareness of the pharmacological properties of common adulterants, and their potential toxicological effects that may warrant their inclusion in cause of death determinations.

Data on pharmacologically active adulterants in drug casework was collected by analysis of seized drug materials from various sites around the United States. The adulterants identified included caffeine, quinine/quinidine, acetaminophen, procaine, diphenhydramine, lidocaine, levamisole, dipyrone, xylazine, and diltiazem. Heroin, fentanyl, methamphetamine, and cocaine are purposefully adulterated with other potent psychoactive drugs including most recently fentanyl analogs such as acetylfentanyl, furanylfentanyl, U-47700, and carfentanil. Recently, the presence of the anticoagulant brodifacoum has been documented in synthetic cannabinoid products in seven Eastern and Midwestern states.

The prevalence of these substances was evaluated in select postmortem and human performance toxicology casework, and basic demographics, including gender, age and state of origin tabulated. This information in addition to the pharmacology and toxicology of the most potentially dangerous substances will be reviewed, and their potential contribution to various drug toxidromes presented.

P99 Etizolam Assessment in a Helium Death

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Death due to helium exposure can result when the gas is purposefully used as an asphyxiant. Even though cause and manner of death determinations in these cases typically rely upon on circumstantial or investigative information only, postmortem toxicology testing is still useful to ascertain the cognitive and/or physical capabilities of the individual prior to death.

Presented is a case of a 36-year old female who was last seen alive about one hour prior to discovery. The decedent was found supine on the bed with a bag over her head and a helium tank with attached hose nearby. Resuscitative efforts were not performed due to the appearance of lividity. No conjunctival hemorrhage or acute trauma were noted. She had a long-standing history of depression and a suicide note from the decedent was found. Medications at the scene included naproxen, gabapentin, and quetiapine, which had all been recently prescribed. There was one pill left in the quetiapine bottle. Comprehensive toxicology testing performed on a femoral blood sample showed the presence of 15 mcg/mL gabapentin, 23 ng/mL diazepam, 63 ng/mL nordiazepam, and 65 ng/mL etizolam. Etizolam is a benzodiazepine that is not approved for use in the United States. Adverse effects associated with its use include confusion, disorientation, and ataxia. For this case, it was relevant to determine if the etizolam in combination with the other drugs may have sufficiently impaired the individual so that she was unable to act alone. To determine the relevance of the etizolam concentration, positive blood concentrations from different patient populations were evaluated. Between May 2015 and April 2018 there were a total of 299 positive blood samples. Quantitative results were obtained for 195 samples with a concentration range of 2.1 - 1300 ng/mL. In 143 samples submitted for postmortem investigation, the mean concentration \pm SEM was 69 ng/mL \pm 10 (range 2.5-1300 ng/mL), and in 16 samples submitted for DUID investigation, the mean concentration \pm SEM was 96 ng/mL \pm 30 (range 2.1-540 ng/mL). Because the 65 ng/mL etizolam concentration is consistent with those concentrations found in DUID cases, it was opined that the individual even taking into account the other drugs, was physically capable of independently acting. The cause of death was asphyxia due to inhalation, and the manner of death ruled suicide.

P100 Bone-Encased Bullet in a Nonfatal Gunshot Wound to the Head Mimicking Homicide in a Decomposed Male

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The decomposed body presents many diagnostic challenges for even the most seasoned forensic pathologist. Often, ancillary testing such as full body radiographs are required to evaluate for the presence of radiopaque material such as bullets or knife blade fragments. The significance of a positive finding of radiopaque material must correlate scene and circumstantial information with full autopsy examination.

We present a case of a 56-year old markedly decomposed male who was known to be homeless and was found dead in an abandoned home. While no foul play was suspected at the scene, postmortem

radiographs revealed a bullet present within the head. Investigative information revealed that both the decedent's mother and brother had been victims of gunshot homicides within the same home. External examination of the head revealed an intact patch of skin over the occipital area of the skull. Reflection of the skin revealed an underlying small defect with rounded edges of the right occipital bone. Upon further dissection, it was found that the bullet was lodged within the occipital bone with remodeled bone encasing an extensively oxidized small caliber bullet. Small fractures incurred due to the penetrating bullet also showed signs of healing.

Although homicide had initially been suspected due to the circumstances and anatomical examination, the presence of healing around the wound indicated that time had passed since the gunshot wound injury. Close inspection of the skull radiograph revealed changes consistent with bone remodeling. Ultimately, due to the remains being skeletonized and showing no other signs of trauma, the cause and manner and death were ruled as "Undetermined".

Healed gunshot wounds to the head are uncommon, and those in which the bullet remains in place are even less common. In the setting of decomposition, this presents an especially difficult diagnostic challenge on initial examination. Postmortem radiograph interpretation along with clinical and anatomical correlation are essential for proper characterization of such a case.

P101 Asphyxia due to Plastic Bag Over Head and Nitrous Oxide: An Accident or a Suicide?

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Although not nearly as common as gun-related and drug-related deaths, asphyxial deaths accounted for 16% of all violent deaths in the Commonwealth of Virginia in 2016. The vast majority of these deaths were deemed suicides. Most commonly, asphyxial deaths result from choking or hanging and manner is typically readily discernible from the circumstances. Less commonly, are deaths the result of traumatic asphyxia (mechanical or positional), and smothering or suffocation. Even less common are those related to inhalation of a toxic agent or oxygen depletion/replacement (e.g. carbon monoxide, carbon dioxide, helium, nitrogen). We present a case from Northern Virginia OCME of an asphyxial death in which determination of manner was not as straightforward as it initially seemed and relied on proper examination and investigation for elucidation of circumstances.

A 47-year-old white female was found deceased in bed by her mother after having not been seen for two days. She was seated cross-legged and had a plastic bag over her upper head. Nearby was a packaging for nitrous oxide whipped cream chargers, as well as cigarette containers and a laptop. The death was reported by police as a probable suicide due to these initial findings and the decedent's history of bipolar disorder with prior suicidal ideation. Examination at the OCME revealed the plastic bag over the head, shoulders, and arms. Inside the bag, the decedent was wearing headphones and there were 15 nitrous oxide canisters and a whipped cream dispenser. There was also a roll of duct tape inside the bag and there was tape twisted around the bag near the hands as if to tighten it. Importantly, there was a snorkel breathing device through the bag sealed with tape. Further investigation revealed the decedent did have significant mental health history and would frequently tape her own bedroom door closed. There was nothing suspicious on the open laptop computer on the bed beside the decedent. There was no suicide note on scene. Postmortem toxicology on liver due to decomposition revealed

Ethanol 0.056% and Diphenhydramine 1.4 mg/L. Due to the overall circumstances and breathing device, the manner of death was best certified as accident.

This case highlights the importance of a thorough death investigation and examination by trained medicolegal death investigators and forensic pathologists.

P102 An Unusual Suicide By Ingestion Of Eosin

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One morning in June the Police a 63-year-old woman was found lifeless at home.

A forensic inspection was requested by the Police.

The circumstantial data, reported by some friends of hers to the Police, indicated that the woman had recently a love disappointment.

A blister of melatonin and an empty bottle of a cutaneous disinfectant containing mainly eosin (with the typical intense pink color) were found next to the corpse.

The preliminary examination of the body, before its removal, did not show the presence of any traumatic lesions, but an intensely pink-colored liquid drained from the nose and the mouth.

During the autopsy the presence of a slight blunt head trauma was highlighted at external examination; the internal examination revealed that the walls of the digestive tract, from oral cavity until the duodenum, as well as the upper airways were characterized by a bright red - fuchsia color; an intense red coloration was noticed during the section of all the organs and tissues.

Therefore, macroscopic data were strongly suggestive for an intake and consequent absorption of the disinfectant (eosin) which had been found nearby the corpse.

The toxicological examination was carried out: it allowed to detect the presence of eosin, at an high concentration, in the gastric content and in parenchymal specimen.

Based on the anamnestic and circumstantial data, the macroscopic and microscopic findings and on the toxicological investigations, the cause of death was identified in an acute intoxication following the intake of eosin. Although the effect of the ingestion of Eosin is unknown (to our knowledge, no cases of eosin intoxication are described, so far, in literature), its lethality may be related to its properties, in particularly concerning the denaturation of proteins, that could potentially cause metabolic alterations.

P103 Pilot Study of Postmortem Thyroid Function Tests

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Background: Sudden cardiac deaths are commonly encountered during forensic practice, and thyroid dysfunction may be involved in such cases. Although some thyroid diseases can be diagnosed by pathologic examination, postmortem findings are limited to only confirming thyroid dysfunction, and postmortem changes or effects on thyroids are not well known.

Material and methods: We retrieved 157 forensic autopsy cases where thyroid function tests (TFT) were performed (thyroid stimulating hormone (TSH), T3, T4, free T4 (FT4) concentrations), no matter what the causes of death were. We also reviewed their postmortem findings with death circumstances and histories. We classified our cases into three groups according to the usual clinical screening for thyroid dysfunction: low TSH, normal TSH, and high TSH.

Results: In 34 cases with low TSH, 28 cases suggested the profile of hyperthyroidism (low TSH, high FT4 and/or high T3), 4 cases revealed a

possible profile of hyperthyroidism (low TSH, high T3 and/or high T4. FT4 was not performed), and two cases revealed just low TSH. In 83 cases with normal TSH, 34 cases revealed abnormal concentrations of T3 or T4 with normal FT4 concentration, 24 cases revealed increased concentration of FT4 (21 cases of them showed a possible profile of abnormal hypothalamic-pituitary function; normal TSH, high FT4, high T3), 11 cases showed decreased concentration of FT4, and 14 cases was unremarkable in TFT. In 40 cases with high TSH, 13 cases suggested a possible profile of hypothyroidism (high TSH, low FT4), 15 cases revealed abnormal concentrations of T3 or T4 with normal FT4 concentration, 9 cases showed a possibility profile of abnormal hypothalamic pituitary function (high TSH, high FT4, high T3), and 3 cases were unremarkable in T3, T4 and FT4 concentrations.

Discussion: In low TSH group, most cases revealed increased weight of thyroid or pathologic findings of thyroid diseases and some cases had past history of hyperthyroidism or thyroidectomy, suggesting that pathologic findings at postmortem examination were comparatively consistent to the profile of hyperthyroidism in TFT. However, in normal TSH and high TSH groups, it was difficult to confirm any thyroid dysfunction because TFT profiles and pathologic findings of thyroid were not consistent in most cases.

Conclusion: TFT in postmortem examination can be helpful in the cases with hyperthyroidism. However, further study is necessary to confirm the diagnosis of thyroid dysfunction at postmortem examination.

P104 Dating Splenic Rupture in Alleged Malpractice

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Splenic rupture is a potentially lethal event. The mortality rate following traumatic splenic ruptures is 1%. Non traumatic mechanism have been reported in 7% of cases, associated with infections, haematological malignancies, tumors. Spleen can also be injured during medical procedures such as gastrointestinal endoscopies, thoracotomies, and shockwave lithotripsies.

Mortality rate is higher in delayed ruptures (15%), where mild symptoms occur after trauma. The mechanism of delayed spleen ruptures (DSR) is still not well known: progressive growth of a subcapsular haematoma, and the development of spleen pseudoaneurysm models have been hypothesized. After rupture, abdominal organs could tampon the rupture, limiting the bleeding. Dating splenic rupture is crucial in both criminal lawsuits and civil litigations, allowing to establish a forensic link between the bleeding and trauma, especially in DSR.

Authors report the case of a 53years-old male patient with left pleural effusion treated with posterolateral thoracotomy in the 7th intercostal space. He was discharged three days after the procedure with Argyle stent and no clinical signs of bleeding. Nonetheless, in the 5th day after the procedure, the patient complained abdominal pain following a syncopal fall, being evaluated in Emergency Department with signs of haemorrhagic shock. Ultrasound showed ruptured spleen and abdominal blood. The patient underwent splenectomy. Blood clots surrounding spleen, spreading around liver and into lower abdominal cavity were found; spleen capsule was shattered with intact diaphragm. Histological evaluation on Hematoxyline&Eosin stain highlighted subcapsular splenic hematoma. After the discharge, the man sued the hospital allegedly linking the splenic rupture to the thoracotomic procedure.

Spleen fragments were analysed with Perls stain, showing no evidence of hemosiderin. Hemosiderin is an intracellular iron storage complex, especially common in macrophages; hemosiderin detection is abundant following haemorrhage, suggesting that its formation may be related to phagocytosis of red blood cells. In cases where the rupture of spleen

occurred within three days after trauma, the initial organization of hemorrhagic infiltration is observed in splenic tissue. Perls stained macrophages containing hemosiderin are found from the fourth day onwards.

In the case presented, the correlation between thoracotomy and spleen rupture was therefore excluded based on the intact diaphragm and the negativity of Perls stain test, dating the spleen hematoma in the 3 days period before the splenectomy. It was then hypothesized the spleen was injured during the fall reported by the patient.

Authors emphasize the importance of specific histological examination for the dating of spleen ruptures for forensic purposes.

P105 Death after Bronchoscopic Biopsy of a Pulmonary Artery Aneurysm Mimicking Bronchial Polyp: Report of 2 Cases and Review of the Literature

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Pulmonary artery aneurysms (PAAs) are rare, and massive hemoptysis can lead to death if appropriate diagnosis and treatment is not provided. PAAs can be of congenital, acquired, or idiopathic origin, and the clinical symptoms are various. Among all reported cases, one-third of the patients died due to rupture. Optimal treatment or guidelines for PAAs remain uncertain. Herein, we report two autopsy cases about PAA. The patient 1 was taking medication for tuberculosis. The patient 2 has no medical history about lung disease. Bronchoscopy revealed a polypoid lesion in both patients, suspected to be an inflammatory polyp. Biopsy was performed and massive bleeding into the airway occurred. The bleeding could not be controlled by bronchoscopic suction, and cardiac arrest occurred 30 minutes after biopsy; the patients subsequently died. In one patient's case, autopsy revealed a round, calcified PAA in the bronchus of the right middle lobe; the end of the PAA was torn. In another patient's case, autopsy revealed a round, calcified PAA in the bronchus of the right lower lobe; the neck of the PAA was torn. Hypovolemic signs, including weak postmortem lividity and pallor of the skin and conjunctivae, were observed in both patients. Visual inspection and histopathological examination of the right lung revealed tuberculosis and congestion in both patients. Cases related PAA are not uncommon, but autopsy cases of death occurring after biopsy of PAA mimicking bronchial polyps are rarely reported.

P106 Point-of-Care Testing for C-Reactive Protein during Postmortem Examinations

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C-reactive protein (CRP) is a good indicator of acute-phase inflammation and is used in the clinical and forensic settings. Furthermore, point-of-care (POC) CRP testing has recently become available, and would be useful during postmortem examinations in the forensic setting. This study evaluated the utility of POC CRP testing during postmortem examinations using cardiac blood from the inferior vena cava. The sample was immediately tested using the POC instrument, and was prepared before the serum was tested using common laboratory instruments. The postmortem POC testing had a high positive predictive value and specificity, and the results were strongly correlated with the laboratory testing results. Thus, POC CRP testing before autopsy appears to be useful, as it provides a rapid result that can guide decision-making and improve the diagnosis during the postmortem examination.

KEYWORDS:

forensic pathology; C-reactive protein; point-of-care testing; autopsy

P107 Scuba Fatalities Revisited

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Abstract: SCUBA (self contained underwater breathing apparatus) deaths are relatively rare. This presents the examining pathologist with a challenge due to limited experience with these types of cases. We present a review of key issues and discuss a fatality in a "technical" dive case. The case highlights the importance of specific types of exams to arrive at the correct diagnosis. It is essential to retrieve a print out of parameters of the fatal dive from the decedent's dive computer and compare it to a similar mock dive programmed and printed out on the same device. In our case, this documented the abnormal ascent time leading to death.

P108 Paraffin Embedded Tissue Samples: A Good Reference Sample for DNA Comparison

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Introduction:

Commonly used reference samples for confirmation of identity using DNA comparison include personal items such as a tooth brush, hair comb, razor and clothing. If no personal items are available, comparison with first degree relatives may be employed. We present a case where a paraffin embedded core biopsy tissue sample was used to confirm the identity of a decedent.

Case Report:

The charred remains of an adult male was found in a burned residential dwelling. A presumptive identification of the decedent was made based on the reported circumstances. The decedent reportedly had not see a dentist, nor have any recent x-rays performed, orthopedic procedures, implanted medical devices or other major surgery. Additionally, all of his personal effects were destroyed in the fire. The family did report that the decedent recently had a biopsy performed at a local hospital. Contact was made with the hospital which confirmed a lung biopsy. The processed biopsy sample was retrieved from the treating facility and DNA comparison was made with the blood sample obtained from the decedent at the time of the autopsy.

Methods:

The sample consisted of three small pieces of tissue approximately 3mm x 5 mm embedded in a block of paraffin. A piece of the biopsy tissue weighing approximately 0.001 gram was removed from the paraffin block. The paraffin was removed from the tissue via a standard operating protocol that utilizes xylene, 100% ethanol, centrifugation and drying. Following the standard procedure for DNA organic extraction, the DNA was extracted from the biopsy sample. Additionally, DNA was extracted from the blood sample from the decedent. Both samples were amplified and typed using the Promega PowerPlex Fusion® 6C System. The alleles were detected using capillary electrophoresis.

Results:

The lung biopsy reference sample produced a single source DNA profile. The autopsy sample from the decedent also produced a single source DNA profile. The two DNA profiles matched at all 23 autosomal loci tested, confirming the identity of the decedent.

Conclusion:

This case highlights the following: 1) that paraffin embedded tissue can be used as a suitable reference sample, so long as the paraffin is adequately removed; 2) even small tissue samples can yield DNA quantities sufficient

for amplification and analysis; 3) the importance of interviews with the family and the value of obtaining a good medical history during a death investigation.

P109 Benign Uterine Leiomyoma Resulting in Anemia and Fatal Hemorrhage: A Case Report

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Introduction: Leiomyomas are benign smooth muscle tumors, which often arise in the uterus. Uterine leiomyomas are the most common tumor in women and may be asymptomatic or have a variable clinical presentation. Common presenting symptoms include pain, abnormal uterine bleeding, infertility, and urinary frequency. Malignant transformation is rare. The associated mortality rate is low, and few case reports exist of death due to complications of uterine leiomyomas. Leiomyomas have been reported to cause death by hemorrhage, intravenous leiomyomatosis, and thromboembolic disease. **Methods:** A case report of natural death in a 50 year old woman due to anemia and external hemorrhage associated with a benign leiomyoma is presented. Autopsy findings and a review of the literature are discussed. **Results:** The decedent was found unresponsive in a bathtub after complaints of vaginal bleeding. Accompanying medical records reveal a clinical history of severe anemia and dysfunctional uterine bleeding, due to uterine leiomyomas. Clinical recommendations for biopsy and hysterectomy were declined for several years prior to demise. Autopsy with gross and microscopic examinations were performed. At the time of autopsy, the decedent was notably pale with nearly absent lividity. The uterus weighed 930 grams and was markedly abnormal with an 18 cm mass protruding through the cervix. The inferior surface of the mass was hemorrhagic and had surface erosion. Histology revealed a benign leiomyoma. **Conclusion:** Uterine leiomyomas are common benign tumors with well-known benign complications. Death due to uterine leiomyomas is extremely rare. We present a case of death due to anemia and hemorrhage associated with a benign uterine leiomyoma. This case also provides the opportunity to discuss the current literature available on death due to sequela of benign uterine leiomyomas.

P110 Buprenorphine: Decedents versus Impaired Drivers

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Background: While buprenorphine is considered a safe drug with a "ceiling effect" at higher doses, its October 2002 FDA approval for administration to treat opioid addiction was followed by deaths due to overdose. Our objective is to reveal risk factors for a fatal outcome and define what may be a therapeutic or lethal blood concentration. **Design:** We examined cases in which buprenorphine was determined to cause or contribute to death, either by itself or in combination with another substance. Buprenorphine first appeared as a cause of death in March 2013, and the Department of Forensic Science began routinely testing samples of impaired drivers in 2017. We were then able to compare decedents with these individuals. All cases were reviewed for the co-administration of illicit/narcotic drugs and psychotropic medications such as benzodiazepines, antidepressants, and antipsychotics. **Results:** A total of 123 cases (51 decedents, 72 drivers) were identified. Thirteen deaths were attributed to buprenorphine intoxication alone, with a mean buprenorphine blood concentration of 9.3 ng/mL (range: not detected at 0.5 ng/mL to 57.9 ng/mL) and mean norbuprenorphine concentration of 6.8 ng/mL. The buprenorphine/norbuprenorphine ratio is 1.37. Decedents whose toxicology also included an illicit and/or narcotic (N=17) had a mean buprenorphine concentration of 3.8 ng/mL (range: not

detected at 0.5 ng/mL to 24.5 ng/mL), mean norbuprenorphine concentration of 5.1 ng/mL, and a ratio of 0.76. If toxicology revealed buprenorphine with a psychotropic medication (N=21), the mean buprenorphine concentration was 4.3 ng/mL (range: not detected at 0.5 ng/mL to 20.9 ng/mL) and norbuprenorphine concentration 7.9 ng/mL; ratio 0.54.

Using the same categorizations regarding impaired drivers, 19 cases with buprenorphine alone had a mean buprenorphine concentration of 2.35 ng/mL (range: 0.67 ng/mL to 5.5 ng/mL) and norbuprenorphine 3.99 ng/mL (ratio=0.59); the addition of an illicit/narcotic demonstrated 1.89 ng/mL buprenorphine (range: not detected at 0.25 ng/mL to 6.5 ng/mL) and 2.82 ng/mL norbuprenorphine (ratio=0.67); and the addition of a psychotropic medication showed 2.59 ng/mL of buprenorphine (range: 0.64 ng/mL to 11.0 ng/mL) and 5.31 ng/mL of norbuprenorphine (ratio=0.49).

Conclusion: Although the average concentration was higher for buprenorphine-only overdoses compared to other buprenorphine-related deaths and intoxicated drivers, their ranges show large overlap indicating additional factors require consideration. A buprenorphine/norbuprenorphine ratio>1 may indicate an acute intoxication. While buprenorphine alone has the potential for overdose, particularly when taken by an opiate-naive individual, lower concentrations in the presence of psychotropic drugs suggests their interaction may cause fatal cardiopulmonary depressant effects.

P111 Evidence of Growing Misuse and Abuse of Loperamide

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Loperamide is an FDA-approved synthetic opioid derivative used to control diarrhea. It is available as over-the-counter (OTC) products in tablets and capsules; the common dosage for adults is a 4 mg loading dose, followed by 2 mg after every episode of diarrhea. Due to its low systemic bioavailability and poor penetration through the blood-brain barrier, loperamide has minimal central nervous system effects at therapeutic dosages. The practice of taking megadoses of loperamide however does produce central opioid-like effects. Earlier this year, the FDA has issued an updated safety alert warning the risk of serious cardiac adverse effects and resultant overdose deaths due to excessively high doses of loperamide. The misuse and abuse of loperamide became increasing popular among drug users seeking to achieve a euphoric state similar to the effect of opioid abuse or for treatment for opioid withdrawal symptoms.

A review of blood concentrations and concomitant findings for 390 forensic loperamide positive cases was conducted. Loperamide was detected by a LC/TOF-MS screen and confirmed using LC-MS/MS in 62% of cases; 38% were submitted for directed loperamide quantitation without general screening. Concentrations greater than 100 ng/mL was found in 58%; the most frequently reported concentrations were >100-250 ng/mL (31%) followed by >25-100 ng/mL (27%). The mean (\pm SD) concentrations of loperamide and desmethylloperamide in postmortem populations were 214 \pm 528 ng/mL (median=130 ng/mL; range: 6.7–9,400 ng/mL) and 728 \pm 920 ng/mL (median=540 ng/mL; range: 10–10,000 ng/mL). Loperamide was the only finding in 17 cases (7.1%) with a mean concentration of 219 ng/mL (range: <10–550 ng/mL). 38 cases (15%) had one additional finding: diphenhydramine (n=8), cannabinoids (n=7), antidepressants (n=6), and low ethanol (n=5). Polypharmacy was detected in 77% of cases; 22%, 21%, and 5% were positive for 2+, 3+ and 7+ drugs, respectively. The most commonly reported concurrent drug class was benzodiazepines (41%) followed by opioids (27%). Other OTC drugs, ethanol and cannabinoids were also frequently detected:

diphenhydramine (22%), ethanol (9.6%), cannabinoids (9.2%), and dextro/levo methorphan (7.1%). For reference purposes, blood concentrations up to 3.0 ng/mL have been reported following therapeutic use.

Loperamide is a safe and effective drug with low potential for abuse when used therapeutically; however, an increased number of fatalities have been reported, and linked to the use of large quantities of loperamide due to over-medication and recreational use. Our data supports the need for loperamide to be included in the scope of a comprehensive postmortem toxicology test.

P112 Gunshot Wound to Anterior Neck, a Case Report

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In the United States, the most common method used to commit suicide is by a self-inflicted gunshot wound, with 60.6% of men and 35.7% of women utilizing a firearm as the weapon. The second most frequently used method for men is hanging, and poisons in women. Other approaches include drowning, falling, pesticides, incised wounds, and suffocation.

Self-inflicted firearm injuries are usually located in the head, specifically the right temple, mouth, and floor of mouth. The anterior neck is one of the least used anatomic sites for self-inflicted gunshot wounds. Of 1,200 reported suicides by gun fire, 857 were found to have entrance wounds to the head, while only 17 had entrance wounds to the neck. We report a case of a 63-year-old man with a self-inflicted gunshot wound to the upper anterior neck.

P113 Utilizing Federal, State, and Local Drug Reporting Databases to Analyze Epidemiological Toxicology Data and Assess Trends Over Time

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The field of forensic pathology has been plagued with an opioid epidemic resulting in increased data reporting systems to monitor both the prevalence and trends of drug use in the United States. Forensic autopsy and toxicology data provide a unique opportunity to assess the epidemiological aspects of the crisis facing our country. Utilizing the federal, state, and other public data reporting systems, available in the "palm of our hands" network analysis of toxicological data was used to identify changes in drug usage trends from 2014-2017.

We retrospectively reviewed all the drug-related deaths' reports at the county coroner's office from 2014-2017. Patient age, gender, race, cause and manner of death, and all toxicological data was recorded from the coroner's drug death reports submitted to the Pennsylvania Department of Drug and Alcohol. 29 autopsies from 2014 and 103 from 2017 were identified. Network analysis was performed on the two data sets.

There were no differences in the ages or genders of patients between years. The mean number of drugs per case, was similar (4.7 and 5.1). In 2014, morphine was the most commonly identified toxicological substance versus fentanyl in 2017. A significant difference in drug prevalence was identified with carfentanil, furanyl fentanyl, U-47700, and 4-ANPP only seen in 2017. No significant difference was seen among manner or cause of death, with accidental and multiple drug toxicity representing the most common respectively.

There were no significant differences in the number of drugs reported per autopsy over the 4 year period. Our data shows the known progression of the opioid epidemic identifying morphine as the most common toxicological substance in 2014 to fentanyl identified as the most common

substance in 2017. Utilization of the readily available drug reporting databases from local, state and national entities a useful tool to analyze toxicological data and assess trends over time.

P114 Abnormal Undress in a Case About Drowning After Pathological Subarachnoid Hemorrhage

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Abnormal undress is generally reported in the death about freezing and low temperature, rarely described in other types of cases. Here, we report the special phenomenon in a drowning case after pathological subarachnoid hemorrhage. In May 2017, a middle-aged woman in a village who had gone out for farming was found in a lotus pond near the laboring field. Only underwear was found on the body, and the clothes were neatly placed on the field without any damage. At autopsy, there were slight bleeds in the eyelids, few sands in the earl and nasal cavity and a small amount of foam in the mouth. Subarachnoid hemorrhage was widely exsited in the parietal lobe, occipital lobe, temporal lobe and basal part of brain. pulmonary edema also was found. Histopathological results confirmed that subarachnoid hemorrhage was pathological. Forensic toxicological analysis ruled out the possibility of death of alcohol and other poisons. A comprehensive analysis showed that the woman's death was caused by drowning after pathological subarachnoid hemorrhage and excluded the possibility of a murder. The abnormal undress should be caused by a sudden pathological subarachnoid hemorrhage during labor which may lead to central nervous dysfunction and abnormal heat sensation or hallucination.

P115 Sudden Exertional Death in Two Young Adults with Sickle Cell Trait

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Sickle cell trait (SCT) is generally regarded as a benign condition; however there is one situation in which it can cause sudden death in a young person. This can occur during a period of sudden and extreme exertion. This cause of death is unusual and generally unappreciated despite having long been recognized by military services. Increased mortality of people with SCT in exertional situations was first recognized by military services after it was observed in a boot camp environment where African American recruits had a 40-fold increased risk of sudden death as compared to that of white recruits. The risk was found to be mostly due to the presence of SCT. Similarly, high school and college students in athletic training with SCT were found to have up to a 37 times increased risk for sudden death while training. The other situation where increased mortality has occurred is during police pursuit, or when decedents were coerced by police into exertion while incarcerated. Sudden death associated with SCT is also age-related, with the rate of death in 28-29 year-olds being eight times that of 17-18 year-olds. Due to the circumstances in which these deaths occur, the cases often involve young persons in high profile situations, such as athletics or in custody. In most cases, the decedents exert themselves beyond their normal exercise tolerance, and then experience malaise with increasing muscle weakness and pain, followed by a relatively rapid collapse and death. High ambient temperatures, poor physical conditioning or dehydration may also be contributing factors. Exertion induced hypoxemia, lactic acidosis, and dehydration in the tissues increase the concentration of hemoglobin S

which produces sickling of the red cells. Laboratory findings may include acute renal failure, rhabdomyolysis or dehydration. Microscopically, red blood cell sickling can be seen within most organs which should prompt confirmation of SCT by hemoglobin electrophoresis testing. We review two cases of this phenomenon; the first a police recruit who died during a training exercise, which highlights the importance of timely recognition of the clinical signs and symptoms in high risk individuals. The second case; a man found deceased two days after fleeing into a wooded area during a police pursuit. Both autopsies were significant for prominent sickling of red blood cells on microscopic examination and diagnoses of SCT were made with post-mortem genetic analysis. Cause of death was exertional sickle cell crisis due to sickle cell trait.

P116 Fatal Dog Attacks and Seizure Disorders: A Limited Case Series

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Fatal dog attacks are uncommon scenarios encountered by the Forensic Pathologist with only 20-30 fatal attacks occurring each year within the United States, the precipitating event oftentimes unknown. However, in three cases reported here, a history of a seizure disorder coupled with autopsy findings indicate a probable inciting factor in the form of a seizure. In each of our cases, an individual with a known seizure disorder was found with fatal antemortem injuries consistent with a dog attack including puncture and crush-type injuries, two of the cases, primarily in the head and neck region. A mixed-breed dog, Pit Bull Terrier-predominant, was the type of dog associated with each of the incidents and the circumstances surrounding death were not witnessed. Two of the three cases displayed pertinent commonalities including lack of "defensive-type" injuries, a key negative autopsy finding, in addition to the presence of a tongue contusion. In conjunction with a known seizure disorder without additional fatal natural or toxicological disease processes at the time of autopsy, the possibility that seizures may be a risk factor for inciting fatal dog attacks is reported and may be an indication of breed-specific behavior.

P117 Alcohol and Crime: A Study of The Blood Alcohol Concentration Found in 280 Cases Collected From Persons Arrested For Various Offences During or Immediately after the Commission of Offence.

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Introduction: It is well known that various kinds of violence are related to alcohol consumption by the offenders. The relationship between alcohol and violence is complex. But its study is important to achieve understanding of violence in the society as well as alcohol related behavior. The Forensic Toxicology division in the dept. of Forensic Medicine, AIIMS, New Delhi provides toxicology service for alcohol estimation for two districts in Delhi namely South and South east districts. It consists of 33 police stations from where the samples are referred to the laboratory.

Material and Methods: The blood samples were collected from the arrested persons by the emergency medical officers and forwarded to the Forensic toxicology lab through the investigating officer. The toxicology reports were given within 3 days of sample submission. The blood samples were collected in EDTA vial with sodium fluoride preservative. The samples were analyzed by using Gas chromatography with Head Space (GC-HS), which is ideal for alcohol estimation. The data of seven years (2011-17) were analyzed for its alcohol concentration, associated crimes and its demographic pattern.

Analysis and Conclusion: Total 280 samples were analyzed in the period 2011-2017. All were males except one female who was a bar dancer. The age group involved was highest in 21-30 years (124 cases). The type of offences involved were Road traffic accidents (RTA), assault cases, drunken driving, drinking in public place, drunk on duty, sexual offence, bestiality, eve teasing, fall etc. The maximum cases were of assault (75 cases) followed by RTA (64 cases). The maximum cases (58 cases) were in the alcohol range of 101-150 mg%, followed by 52 cases in 51-100 mg% range. The maximum blood alcohol level detected was 391.51 mg%, who was a security guard found unconscious on duty.

P118 Homicidal Neck Compression- Should Histological Sampling of Neck Muscles Be Routine?

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A very broad range of injuries is found in homicidal neck compression cases, from minimal contusions to florid contusions with crushing of neck structures. Findings at the milder end of this spectrum are sometimes confounded by the fact that non-fatal neck injuries can be sustained in a variety of altercations (particularly in domestic violence) that may have preceded death. Histologic sections of neck injuries are not often taken and literature discussing these findings is sparse.

We reviewed a series of homicidal neck compression (manual/ligature strangulation) cases from the state of New Jersey collected over 6 years (2012 – 2017). Pediatric cases, decedents with significant decomposition, and cases with sharp force injuries of the neck were excluded. The 59 cases that met the inclusion criteria included 23 cases of manual strangulation, 22 cases of ligature strangulation, and 14 cases of neck compression NOS. As expected, there was a preponderance of female victims (69%). The victims had an average age of 42 years (male 49; female 38), an average height of 65" (male 67"; female 64") and an average weight of 165 pounds (male 188 lb; female 155 lb.). Fractures of the hyoid bone and/or cartilages of the neck were noted in 39% of cases (male 56%; female 32%).

Histologic sections of neck muscles were taken in only 8 cases (14%), and fractures were noted in only one of these cases. All cases with histology were from female victims, and the mechanisms of compression included manual strangulation (3), ligature strangulation (3), and neck compression NOS (2). Histologic findings showed extravasated red blood cells that were predominantly interfascicular, extending between individual muscle fibers in some areas. Both acute (predominantly neutrophils) and chronic inflammatory cells were noted. The inflammatory cells typically consisted of individual cells, sparsely scattered throughout the areas of injury and intermixed with intact RBC's. Aggregates of inflammatory cells and/or perivascular localization of inflammatory cells was not seen, suggesting that these cells were extravasated along with the surrounding red blood cells and are not marginating to the site in response to the injury. Rare monocytic cells were also noted admixed with the extravasated red blood cells, however, no definitive hemosiderin deposition or active macrophage activity was noted on H&E sections. These findings are in line with the sparse reported literature on histologic findings in strangulation cases. The implications of interpretation of such findings for homicide prosecutions will be discussed.

P119 Use of Postmortem Computed Tomography (PMCT) in Second Autopsy and Embalmed Cases

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The repeat forensic examination of remains after autopsy and/or embalming presents challenges for the medical examiner and forensic radiologist. The conduct and protocol for the first autopsy will vary from venue to venue particularly in cases examined outside the United States. Besides alteration of anatomic relationships and removal of material, physical cutting and manipulation introduce changes that must not be misinterpreted as pathologic.

Medicolegal death investigation at the Office of the Armed Forces Medical Examiner (OAFME) includes whole-body digital radiography (DX) and computed tomography (PMCT) prior to forensic autopsy. Findings from PMCT scans in 17 cases where prior autopsy and/or embalming was performed were retrospectively compared to DX and the results of the second forensic autopsy. Based upon consensus review by two medical examiners, contribution of PMCT in the case was judged to (1) add information critical for the second autopsy, (2) provide helpful information for the second autopsy conduct and conclusion, or (3) provide no additional information.

Bone cutting was recognized on PMCT from location, linearity, and margin. Bone fracture occurring during first autopsy required second autopsy check for the presence of hemorrhage. Aberrant placement of organs was seen on PMCT, and some structures like the hyoid were localized. Specific identification and pathologic change in solid organs was not routinely evident and required direct examination. Body surface alterations from cutting, sewing, and injection are easy to overlook on PMCT unless fluid or other material has been utilized. Introduction of air into vessels and soft tissue during embalming must be distinguished from decomposition. In 2 ballistic injury cases, PMCT revealed critical information that was not found on autopsy and DX. In 10 cases, CT assisted conduct of the autopsy by recognizing skeletal injury and enabling evidence recovery. Second autopsy with DX derived no direct benefit from imaging in 5 cases.

Postmortem CT imaging prior to second autopsy was helpful to the medical examiner in 70% of cases. Awareness of autopsy procedures and the embalming process will keep those reading PMCT from misinterpreting changes secondary to the procedure as pathologic. PMCT imaging has the potential to improve the accuracy and completeness of second autopsy.

P120 A Medical Examiner's Investigation of a Work-Related Fatality

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This is a case study review of Occupational Safety and Health Administration (OSHA) requirements for proper use and safety for permit-required confined spaces (silos).

Injuries resulting from employment fall under the medical examiner's jurisdiction. Medical examiner (ME) offices should be aware of OSHA standards for safety and rescue (recovery).

The 47-year-old male decedent was at work for a company that produced wood flooring. Sawdust was stored in 80-foot concrete silos. A fire had recently occurred in one of the silos.

One Saturday at approximately 1245 hours a worker noticed a large cloud of sawdust come out of an open access panel in the silo. A scissor lift with bucket was next to the access panel. The decedent could not be located. A law enforcement agency, a fire department, emergency medical services and the medical death investigator (MDI) from the ME office responded to the scene.

When the MDI arrived at the scene, fire was using vacuums trucks and hand tools to remove sawdust from the silo. Members of the decedent's family were present. OSHA was contacted times two.

The decedent was located in the sawdust, standing upright, at 1649 hours. Approximately 35 feet of sawdust had collapsed on top of the decedent. It is postulated that the decedent entered the silo via the access panel to flush out debris from the fire, when the sawdust above him collapsed.

OSHA did arrive on scene, after recovery of the body.

During autopsy examination the decedent was clad in raincoat. There was no evidence of a safety harness or ventilator mask. The body was covered with sawdust. Internal examination revealed sawdust impacted in the bronchi.

The silos were OSHA permit-required confined spaces. Entry into these spaces requires a permit, authorization from managers, personal protective equipment (PPE) and other equipment. The company is also required to have a rescue service.

OSHA requested photographs taken by the MDI. The OSHA official stated policies were violated by the fire department and the company. Work-related fatalities are required to be reported to OSHA within eight hours. This is review of the standards of safety for permit-required confined spaces, what constitutes a rescue versus a recovery and what should occur when OSHA does not respond to the scene.

P121 Peritoneal Carcinomatosis Secondary to Adenocarcinoma Arising in a Colonic Diverticulum

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Diverticular disease is one of the most common diseases in the United States affecting up to 50% of individuals over the age of 60. It is considered a disease of Western countries with the highest prevalence in the United States, Australia, and Europe. Prevalence rates of less than 0.5% are seen in developing countries such as Africa and Asia. Diverticular disease results from protrusion of the colonic mucosa through the muscular layer of the colon. A low fiber diet, chronic constipation, and obesity have all been associated with diverticular disease. It commonly occurs in the sigmoid colon due to its decreased diameter and higher intraluminal pressure.

Diverticulitis is inflammation within a diverticulum and occurs in up to 10% of individuals with diverticulosis. Symptoms include abdominal pain, fever, cramping, diarrhea, and constipation. Complications include abscess formation, fistulae formation, perforation, and peritonitis. Diverticulosis can be diagnosed by colonoscopy, but colonoscopy is contraindicated in individuals with suspected diverticulitis. CT scan is the method of choice for diagnosing diverticulitis. Adenocarcinoma arising in a diverticulum is rare and can easily be missed. Because the mucosal surface of the colon is often not involved, colon cancer arising in diverticulum may not be seen with colonoscopy. Distinguishing diverticulitis and colon cancer on CT scan can be difficult as both present with a thickened bowel wall. Bowel resection is sometimes warranted in severe cases of diverticulitis but is not performed in all cases. Therefore, it is important to consider adenocarcinoma arising from a diverticulum in cases of diverticulitis when surgery is not warranted.

We present a case of a 62-year-old female with an unknown medical history who was found deceased in her home. Her only complaint was shortness of breath the night prior to her death. An autopsy revealed multiple white plaques covering the peritoneal aspect of the diaphragm and serosal surface of the small bowel. Fibrinopurulent exudate was noted on the serosal surface of the sigmoid colon. Purulent material oozed from the colonic tissue upon manipulation. Opening the sigmoid

colon revealed multiple diverticula. Histologic examination of the sigmoid colon revealed adenocarcinoma arising from a diverticulum. Histologic examination of the white plaques on the diaphragm revealed adenocarcinoma morphologically similar to that seen in the colon. The overlying mucosa was not involved. This case provides a nice example of carcinomatosis secondary to adenocarcinoma arising from a diverticulum that may have been missed in a work-up for diverticulosis and diverticulitis.

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NAME 2019

Interim Meeting

February, 19 2019

Hyatt Regency Baltimore
Inner Harbor
Baltimore, Maryland

Program Chair: **David Fowler, MD**
Topic: **Postmortem Radiology**

<https://www.thename.org/interim-meetings>





NAME 2019

Annual Meeting & Exhibits

October, 18–22, 2019

Sheraton Kansas City Hotel
at Crown Center

Kansas City, Missouri

