

# NAME 2021

Annual Meeting Program

October 15 – 19, 2021

[www.thename.org](http://www.thename.org)



**Hilton West Palm Beach**

West Palm Beach, FL



# Thank YOU

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## Table of Contents

Welcome to Annual Meeting .....	3
Hilton West Palm Beach Hotel Map .....	4
NAME Officers and Board of Directors .....	5
NAME Committees .....	7
CME Information .....	13
Meeting Program .....	15
<b>Exhibits:</b>	
Exhibit Schedule .....	33
Exhibit Hall Map .....	34
Participating Exhibitor Descriptions .....	35
<b>Optional/Special Programs:</b>	
NAME Foundation Outreach Fundraiser .....	39
Rigor Run/Walk .....	39
Cadaver Open Golf Tournament .....	39
Learn to Lead in Forensic Pathology from Chief Medical Examiners – Breakfast Workshop .....	40
Femme Fatale Luncheon .....	40
Abstracts .....	43
Author Index .....	97



**NOTES**

## **Welcome to the NAME 2021 Meeting!**

Dear Colleagues and Friends,

Welcome to the National Association of Medical Examiners 2021 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 2021 Annual Meeting will be held from Friday, October 15 through Tuesday, October 19, 2021 at the Hilton West Palm Beach.

Our meeting will feature presentations and posters surrounded by Palm Trees and an Ocean Breeze.

The NAME Business Meeting will be held at the Hilton on Monday morning (October 18) 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 <https://www.thename.org/2021-program>.

### **Special Events**

Friday evening (October 15) will begin the social activities. We will kick off the meeting with our annual Friday evening welcome reception and dinner at the Hilton.

The 23<sup>rd</sup> Annual Rigor Run/Dead Man's Walk will take place early Sunday (October 17) morning. The 26<sup>th</sup> Annual Cadaver Open Golf Tournament will be held Sunday afternoon following the morning scientific sessions.

Monday (October 18) 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 19). This year we initiated a new award – the John Edland Integrity Award. This was awarded to all incoming forensic pathology fellows by the pathology programs they matriculated from with a commemorative coin from NAME. John Edland was the forensic pathologist who autopsied the Attica prisoners, guards and observers killed in the Attica riot, fifty years ago. Dr. Edland stood firm in excellent and truthful autopsy findings, contradicting the version initially provided to the public by the government and police. This is to commemorate the truth he told and the price he paid. Dr. Edland changed the dialogue on prisons, incarceration and police accountability in this country. His widow and three daughters will accept the first minted commemorative coin and speak briefly on the events from the family view. It is a reminder to new fellows entering the profession of the absolute need for integrity and truth and our obligation to represent the decedents fairly and objectively.

### **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 Snethen 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.

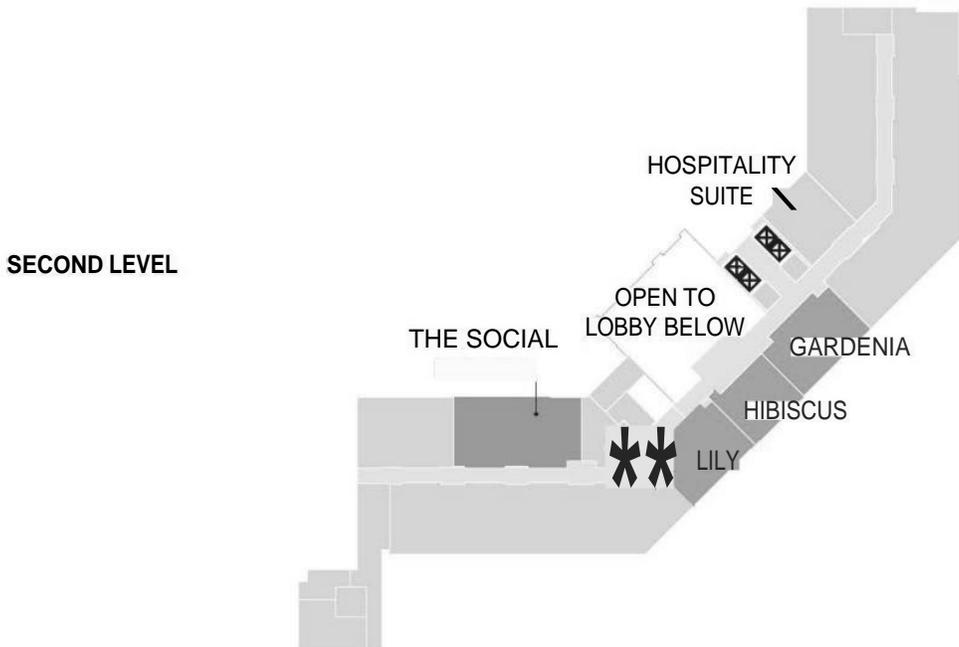
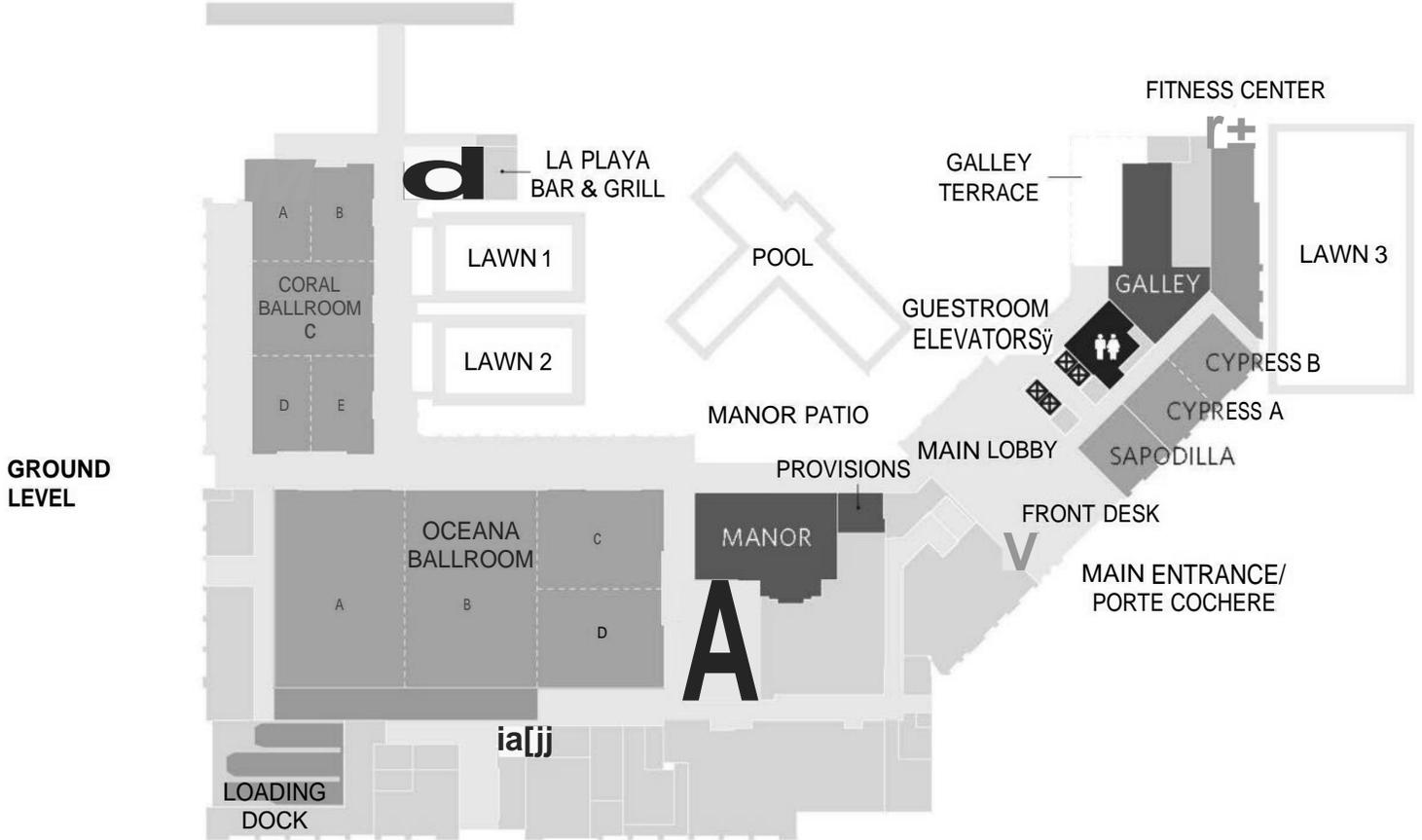
We welcome both our established and new colleagues and look forward to your active participation, which is essential to the success of this meeting. We hope that our new colleagues will consider joining NAME to take advantage of the year-round interactions that our current members enjoy.

***Jennifer Hammers, DO, 2021 Program Chair***  
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# HOTEL LAYOUT

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Nika Aljinovic, MD  
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Ashley Lukefahr, MD

Katherine Maloney, MD  
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Kathryn Pinneri, MD  
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Cori Breslauer, MD  
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Lauren Decker, MD  
Maura DeJoseph, DO  
Sapna Desai, MD  
Daniel Dye, MD  
Lauren Edelman, MD  
Susan Ely, MD  
Willis Ashton Ennis, MD  
Joseph Felo, DO  
Meredith Frank, MD  
Kristinza Giese, MD  
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Karen Kelly, MD  
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Amanda Maskovyak, MD  
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Jerri McLemore, MD  
D. Kimberley Molina, MD  
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Maria Teresa Tersigni-Tarrant, BS  
Jack Titus, MD  
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**EPP-Journal**

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Susan Ely, MD  
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Lauren Edelman, MD  
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**NOTES**



**CME Accreditation Statement:** This activity (“National Association of Medical Examiners 2021 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 2021 Annual Meeting”) for a maximum of 28.25 *AMA PRA Category 1 Credit(s)*<sup>™</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.

#### **Educational Objective/Target Audience**

The objective of the NAME 2021 Annual Meeting is to increase basic and applied pathology knowledge, focusing on autopsy and forensic pathology. The NAME 2021 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 2021 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.

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#### **ADDITIONAL INFORMATION**

##### **How to Apply for CME Credit:**

CME application forms will be available online at by October 15, 2021 and must be submitted no later than December 31, 2021. Should you have questions about your CME application contact Tara Snethen, Meetings Manager/Assistant Executive Director (phone 240-498-2918; email: [tsnethen@thename.org](mailto:tsnethen@thename.org))

**NOTES**

## **NAME 2021 MEETING PROGRAM**

### **FRIDAY, OCTOBER 15, 2021**

#### **GENERAL INFORMATION [NOT CME]:**

10:00 AM – 4:00 PM	Pre-Registration (Exhibitors & Attendees) <i>Oceana Foyer, Ground Level</i>
1:00 PM – 4:00 PM	Installation of Exhibits <i>Oceana Ballroom, Ground Level</i>
5:30 PM – 9:00 PM	Grand Opening of Exhibits; Welcome Reception and Dinner (Registrants and Ticket Holders Only) <i>Oceana Ballroom, Ground Level</i>

#### **COMMITTEE MEETINGS [NOT CME]:**

8:00 AM – 9:00 AM	Foundation Meeting <i>Cypress, Ground Level</i>
12:30 PM – 4:30 PM	Strategic Planning Committee Meeting <i>Coral Ballroom, Ground Level</i>
3:00 PM – 5:00 PM	Ad Hoc Meeting on Organ and Tissue Procurement <i>Cypress, Ground Level</i>
4:30 PM – 5:30 PM	Ad Hoc Meeting on Protocols for Interagency Interactions in Mass Fatality Incidents <i>Sapodilla, Second Level</i>
4:30 PM – 5:00 PM	NAME Foundation Business Meeting <i>Gardenia, Ground Level</i>

### **SATURDAY, OCTOBER 16, 2021**

#### ***Indicates the following:***

- \*John Smialek Best Resident/Fellow Platform/Poster Competition
- \*\*Mary Fran Ernst Best Affiliate Platform/Poster Competition
- \*\*\*Susan P. Baker Public Health Impact Award
- \*\*\*\*John Pless Best Student Platform/Poster Competition
- #Edward J. Barbieri Forensic Toxicology Award
- ##Sudden Unexplained Death in Childhood (SUDC) Foundation Award

#### **GENERAL INFORMATION:**

6:45 AM – 8:00 AM	Buffet Breakfast (Registrants and Ticket Holders Only) [NOT CME] <i>Oceana Ballroom, Ground Level</i>
8:00 AM – 4:00 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>
5:20 PM – 6:20 PM	Resident/Fellow Reception [NOT CME] <i>Event Lawns, Ground Level</i> <i>Sponsored by our Diamond Level Corporate Partner, NMS Labs</i>
8:00 PM – 10:00 PM	NAME FOUNDATION OUTREACH FUNDRAISER <i>Coral Ballroom, Ground Level</i>

#### **COMMITTEE MEETINGS [NOT CME]:**

12:30 PM – 1:30 PM	Past Presidents' Committee Meeting and Lunch <i>Sapodilla, Ground Level</i>
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#### **PROGRAM INFORMATION:**

8:00 AM – 8:15 AM	Welcome and Introduction [NOT CME] <i>Coral Ballroom, Ground Level</i>
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<b>8:15 AM – 10:05 AM</b>	<b>SESSION 1: AWARD CONTENDERS I</b> <b>Moderators: Jan Gorniak, DO, Clark County Office of the Coroner/Medical Examiner, Las Vegas, Nevada, United States of America and Samuel Prahlow, OMS-II, MPH, Philadelphia College of Osteopathic Medicine - South Georgia, Moultrie, Georgia, United States of America</b> <i>Coral Ballroom, Ground Level</i>
8:15 AM – 8:30 AM	1.1 Proliferation of Novel Synthetic Opioids in Postmortem Investigations Post Core-Structure Scheduling for Fentanyl <i>#Donna M. Papsun, MS, NMS Labs, Horsham, Pennsylvania, United States of America</i>
8:30 AM – 8:45 AM	1.2 Clonazepam Intoxication Case Report: Danger of Designer Benzodiazepines <i>#Caley Moore, BA, Duquesne University, Pittsburgh, Pennsylvania, United States of America</i>
8:45 AM – 9:00 AM	1.3 The Importance of Forensic Toxicology Testing of Hospital Admission Samples in Delayed Suspected Intoxication Deaths <i>#Donald Turbiville, MD, Yale School of Medicine, New Haven, Connecticut, United States of America</i>
9:00 AM – 9:15 AM	1.4 WITHDRAWN
9:15 AM – 9:30 AM	1.5 The Manhole Murders: An Examination of Mortality Risk in Homeless Individuals <i>****Adrienne Aardema, BS, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America</i>
9:30 AM – 9:50 AM	1.6 What's Old is New Again: The Reemergence of para-Fluorofentanyl <i>#Prentiss Jones, Jr., PhD, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America</i>
9:50 AM – 10:00 AM	1.7 How Does a Mass Casualty Event Impact Staff of the Coroner's Office and is Meditation an Effective Tool for Mediating These Impacts? <i>****Ashley Prandecki, UNLV School of Medicine, Henderson, Nevada, United States of America</i>
10:00 AM – 10:05 AM	Questions
10:05 AM – 10:30 AM	VISIT EXHIBITS [NOT CME]
10:05 AM – 10:30 AM	BREAK [NOT CME] <i>Sponsored by our Platinum Level Corporate Partner, Lodox Systems</i>
10:05 AM – 10:30 AM	VISIT POSTERS
<b>10:30 AM – 12:00 PM</b>	<b>SESSION 2: AWARD CONTENDERS II</b> <b>Moderators: Jan Gorniak, DO, Clark County Office of the Coroner/Medical Examiner, Las Vegas, Nevada, United States of America and Samuel Prahlow, OMS-II, MPH, Philadelphia College of Osteopathic Medicine - South Georgia, Moultrie, Georgia, United States of America</b> <i>Coral Ballroom, Ground Level</i>
10:30 AM – 11:00 AM	2.1 Analyzing Acute Reactions in the Loss of A Loved One and Expectations from a Coroner's Office <i>****Shalini K. Karunanayake, Dr, MBBS,DLM,MD, Marian County Coroner's Office, Indianapolis, Indiana, United States of America</i>
11:00 AM – 11:15 AM	2.2 Caribbean Pathology and Laboratory Medicine Student Initiative <i>****Ann-Marie Ming Hon, BMedSc, The University of the West Indies, St. Augustine, Trinidad and Tobago</i>

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

11:15 AM – 11:30 AM	2.3 Manner of Death Trends in Texas, Before and During the COVID-19 Pandemic ****Kevin Huynh, BS, MS, Sam Houston State University College of Osteopathic Medicine, Conroe, Texas, United States of America
11:30 AM – 11:40 AM	2.4 Frequency of Frontotemporal Lobar Degeneration (FTLD) in the Homeless Population Cecilia Zhou, BA, UT Southwestern Medical Center, Dallas, Texas, United States of America
11:40 AM – 11:55 AM	2.5 Overdosed Death of a Young Female with Multiple Rare Syndromic Features Mayer-Rokitansky-Küster-Hauser Syndrome And Features Of Goldenhar Syndrome. A Case Report and Literature Review ****Shalini K. Karunanayake, Dr, MBBS,DLM,MD, Marian County Corner's Office, Indianapolis, Indiana, United States of America
11:55 AM – 12:00 PM	Questions
12:00 PM – 1:30 PM	LUNCH (ON YOUR OWN) [NOT CME]
12:00 PM – 1:30 PM	POSTER SESSION P1 – P31 [AUTHORS AT POSTERS 12:00PM – 1:00PM]
<b>1:30 PM – 3:00 PM</b>	<b>SESSION 3 (Part 1): AWARD CONTENDERS III</b> <b>Moderators: Jessica Dwyer, MD, The Office of the Medical Examiner, Southwestern Institute of Forensic Sciences, Dallas, Texas, United States of America and Caley Moore, Duquesne University, Pittsburgh, Pennsylvania, United States of America</b> <i>Coral Ballroom, Ground Level</i>
1:30 PM – 1:45 PM	3.1 The Impact of Donor Preparation for Organ/Tissue Harvesting on Postmortem Vitreous Isopropanol ****Annamaria Melton, BS, BA, Idaho College Of Osteopathic Medicine, Meridian, Idaho, United States of America
1:45 PM – 2:00 PM	3.2 Forensic and Investigative Scene Factors Associated with the Undetermined Manner of Death ****Betsy Adelizzi, PhD, American Military University, Fulshear, Texas, United States of America
2:00 PM – 2:15 PM	3.3 The Value of the Defence Postmortem Examination in England and Wales. ****Finn Auld, MB.BS, University of Ottawa, Ottawa, Ontario, Canada
2:15 PM – 2:30 PM	3.4 Let's Talc about Drugs: Excipient Lung Disease and Interpretation of Postmortem Findings *Kasey Kreutz, MD, Washington University in St. Louis, St. Louis, Missouri, United States of America
2:30 PM – 2:45 PM	3.5 The Postmortem Interpretation of Cardiac Genetic Variants of Unknown Significance in Sudden Death in the Young: A Case Report *Saleh Fadel, MD, BSc, University of Ottawa, Ottawa, Ontario, Canada
2:45 PM – 3:00 PM	3.6 Complex and Complicated Suicide: An Analysis of Suicide Cases From One Academic Institution and a Literature Review *Catherine Perez, MD, University of Michigan, Ann Arbor, Michigan, United States of America
3:00 PM – 3:30 PM	VISIT EXHIBITS [NOT CME]
3:00 PM – 3:30 PM	BREAK [NOT CME]
3:00 PM – 3:30 PM	VISIT POSTERS

<b>3:30 PM – 5:25 PM</b>	<b>SESSION 3 (Part 2): AWARD CONTENDERS III</b> <b>Moderators: Jessica Dwyer, MD, The Office of the Medical Examiner, Southwestern Institute of Forensic Sciences, Dallas, Texas, United States of America and Caley Moore, Duquesne University, Pittsburgh, Pennsylvania, United States of America</b> <i>Coral Ballroom, Ground Level</i>
3:30 PM – 3:45 PM	3.7 Autoerotic Death by Electrocution: An Atypical Case Study <i>*Elizabeth V. Mcleod, MS, MD, Madigan Army Medical Center, Tacoma, Washington, United States of America and Elizabeth K. Loughney, MD, Madigan Army Medical Center, Tacoma, Washington, United States of America</i>
3:45 PM – 4:00 PM	3.8 Placental Pathology in Mothers Positive and Negative for SARS-CoV-2 <i>*Daniel Chadwick Butler, MD, Medical University of South Carolina, Charleston, South Carolina, United States of America</i>
4:00 PM – 4:15 PM	3.9 Suicide by Gaseous Displacement of Atmospheric Oxygen with Carbon Dioxide from Dry Ice Sublimation <i>*Fabiola A. Righi, Mayo Clinic, Rochester, Minnesota, United States of America</i>
4:15 PM – 4:30 PM	3.10 A Case of Type 1 Citrullinemia Presenting as Sudden Death in Infancy <i>*David Michael Waters, MD, Cook County Medical Examiner's Office, Chicago, Illinois, United States of America</i>
4:30 PM – 4:45 PM	3.11 Two Cases of Fatal Thrombotic Complications Following Ad26.COV2.S Vaccine <i>*Batoul A. Aoun, DO, Michigan Medicine, University of Michigan, Ann Arbor, Michigan, United States of America</i>
4:45 PM – 5:00 PM	3.12 Aerial Lift-Related Deaths: A Forensic Pathology Perspective <i>*Christopher Ramos, MD, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America</i>
5:00 PM – 5:20 PM	3.13 Hybrid Capture Panel Targeting Coding and Non-coding Regions Associated with Sudden Cardiac Death Enables Faster Diagnosis of Sudden Unexplained Death in the Young <i>##Elias Salfati, PhD, The Scripps Research Translational Institute, La Jolla, California, United States of America</i>
5:20 PM – 5:25 PM	Questions

## **SUNDAY, OCTOBER 17, 2021**

### **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 <sup>th</sup> Annual Cadaver Open Golf Tournament (Optional) [NOT CME] <i>*Additional Payment Required*</i> <i>Sponsored by CryoLife, Inc.</i>

**PROGRAM INFORMATION:**

- 8:00 AM – 9:30 AM**      **SESSION 4 (Part 1): AWARD CONTENDERS IV**  
**Moderator: Erin Brooks, MD, University of Wisconsin Hospital and Clinics, Madison, Wisconsin, United States of America**  
*Coral Ballroom, Ground Level*
- 8:00 AM – 8:15 AM      4.1 An Unusual and Fatal Branchial Cyst Case  
*\*Cristo J. Guardado Salazar, MD, Robert Wood Johnson Medical School, New Brunswick, New Jersey, United States of America*
- 8:15 AM – 8:30 AM      4.2 Neuropathology and Molecular Mechanisms in Sudden Unexplained Death in Childhood (SUDC)  
*Declan McGuone, MB, BCh, Yale School of Medicine, New Haven, Connecticut, United States of America*
- 8:30 AM – 8:45 AM      4.3 WITHDRAWN
- 8:45 AM – 9:00 AM      4.4 COVID-19-Associated Youth Suicides in Clark County, Nevada, So What?  
*\*\*\*Candace Caterer, Clark County Office of the Coroner/Medical Examiner, Las Vegas, Nevada, United States of America and Jan M. Gorniak, DO, MHSA, Clark County Office of the Coroner/Medical Examiner, Las Vegas, Nevada, United States of America*
- 9:00 AM – 9:10 AM      4.5 Perforations of the Heart during Elective Removal of an Inferior Vena Cava Filter: A Case Report  
*\*\*\*Sapna P. Desai, MD, Connecticut Office of the Chief Medical Examiner, Farmington, Connecticut, United States of America*
- 9:10 AM – 9:30 AM      4.6 The Public Health Role of Medical Examiner's Offices during COVID-19 and Other Mass Fatality Events  
*\*\*\*Manreet K. Bhullar, MPH, Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, United States of America*
- 9:30 AM – 10:00 AM      VISIT EXHIBITS [NOT CME]
- 9:30 AM – 10:00 AM      BREAK [NOT CME]
- 9:30 AM – 10:00 AM      VISIT POSTERS
- 10:00 AM – 11:30 AM**      **SESSION 4 (Part 2): AWARD CONTENDERS IV**  
**Moderator: Erin Brooks, MD, University of Wisconsin Hospital and Clinics, Madison, Wisconsin, United States of America**  
*Coral Ballroom, Ground Level*
- 10:00 AM – 10:15 AM      4.7 Autopsy-Diagnosed Injury Deaths in Persons with Acute or Chronic Alcohol Use: A review of 1000 Deaths with History of Alcohol Use  
*\*\*\*Jay Stahl-Herz, MD, New York City Office of Chief Medical Examiner, New York, New York, United States of America*
- 10:15 AM – 10:30 AM      4.8 Sudden Death in Diabetic Ketoacidosis Complicated by Sickle Cell Trait  
*\*\*\*Georgia E. Dau, BS, Uniformed Services University of the Health Sciences, San Antonio, Texas, United States of America*
- 10:30 AM – 10:45 AM      4.9 SARS-Cov-2 (COVID-19) Survival in Embalmed Bodies  
*\*\*\*Lorenzo Gitto, MD, State University of New York, Upstate Medical University, Syracuse, New York, United States of America*

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

10:45 AM – 11:05 AM	4.10 An Outbreak of Legionnaire’s Disease at the Illinois Veterans’ Home in Quincy, IL in 2015: Implications for Medicolegal Death Investigation and Public Health, and History Continually Repeats Itself <i>***Scott Denton, MD, McLean County Coroner’s Office, Bloomington, Illinois, United States of America</i>
11:05 AM – 11:25 AM	4.11 The Medical Examiner-Coroner and Public Health: An Innovative and Collaborative Approach to the Covid-19 Pandemic: The Experience of Santa Clara County, CA <i>***Michelle A. Jorden, MD, Santa Clara County Medical Examiner-Coroner, San Jose, California, United States of America and Christine Y. Chen, MD, MPH, New York-Presbyterian/Queens, New York, New York, United States of America</i>
11:25 AM – 11:30 AM	Questions
11:30 AM – 1:30 PM	LUNCH (ON YOUR OWN) [NOT CME]
11:30 AM – 1:30 PM	POSTER SESSION P34 – P66 [AUTHORS AT POSTERS 11:30AM – 12:30PM]
<b>1:30 PM – 3:00 PM</b>	<b>SESSION 5: WORKSHOP</b> <b>Moderators: Thomas Gilson, MD, Cuyahoga County Medical Examiner’s Office, Cleveland, Ohio, United States of America and Manreet Bhullar, Cuyahoga County Medical Examiner’s Office, Cleveland, Ohio, United States of America</b> <i>Coral Ballroom, Ground Level</i>
1:30 PM – 3:00 PM	5.1 The Native American Graves Protection and Repatriation Act and the Medicolegal System: Legal Requirements for Offices and Practitioners <i>Megan Kleeschulte, MA, University of Tennessee, Knoxville, Knoxville, Tennessee, United States of America, Ellen Lofaro, PhD, University of Tennessee, Knoxville, Knoxville, Tennessee, United States of America, and Ryan Wheeler, PhD, Phillips Academy, Andover, Massachusetts, United States of America</i>
3:00 PM – 3:30 PM	VISIT EXHIBITS [NOT CME]
3:00 PM – 3:30 PM	BREAK [NOT CME] <i>Sponsored by our Platinum Level Corporate Partner, Lodox Systems</i>
3:00 PM – 3:30 PM	VISIT POSTERS
<b>3:30 PM – 5:35 PM</b>	<b>SESSION 6: COVID AND UNUSUAL CASES (PART 1)</b> <b>Moderators: Thomas Gilson, MD, Cuyahoga County Medical Examiner’s Office, Cleveland, Ohio, United States of America and Manreet Bhullar, Cuyahoga County Medical Examiner’s Office, Cleveland, Ohio, United States of America</b> <i>Coral Ballroom, Ground Level</i>
3:30 PM – 3:55 PM	6.1 Implementation of Digital Microscopy in a Combined Forensic and Hospital Autopsy Practice <i>Reade Quinton, MD, Mayo Clinic, Rochester, Rochester, Minnesota, United States of America</i>
3:55 PM – 4:10 PM	6.2 Sudden Infant Deaths with COVID-19: A Report of Three Cases <i>Alexander E. Ladenheim, MD, University of California Davis Health, Sacramento, California, United States of America and Jacob Donnelly, DO, University of California Davis Health, Sacramento, California, United States of America</i>
4:10 PM – 4:25 PM	6.3 Spontaneous Multiple Arterial Dissection in a COVID-19 Positive Decedent <i>Christine James, DO, Johnson County Medical Examiner’s Office, Olathe, Kansas, United States of America</i>
4:25 PM – 4:45 PM	6.4 WITHDRAWN

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

- 4:45 PM – 5:00 PM 6.5 Fatal Iatrogenic Intrapartum Neonatal Cervical Spinal Injury: One Pull Too Many  
*Alfredo E. Walker, FRCPATH, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada*
- 5:00 PM – 5:15 PM 6.6 Mob Justice Fatalities at the Pretoria Medico-Legal Laboratory: A Review  
*Gert Saayman, FCFORPATH(SA), University of Pretoria, Pretoria, Gauteng, South Africa*
- 5:15 PM – 5:30 PM 6.7 A Review of Asphyxial Deaths Resulting from Constrictor Snakes: Including Actual Video Demonstration  
*William C. Rodriguez, III, Ph.D., Office of the Armed Forces Medical Examiners System, Dover AFB, Delaware, United States of America*
- 5:30 PM – 5:35 PM Questions

**MONDAY, OCTOBER 18, 2021**

**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*

**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 – 10:45 AM VISIT EXHIBITS [NOT CME]
- 10:00 AM – 10:45 AM BREAK [NOT CME]  
*Sponsored by our Platinum Level Corporate Partner, Lodox Systems*
- 10:00 AM – 10:45 AM VISIT POSTERS
- 10:45 AM – 12:00 PM **SESSION 7: UNUSUAL CASES (PART 2)**  
**Moderators: Susan Ely, MD, MPHTM, New York City Office of the Chief Medical Examiner, New York, New York, United States of America and Meagan Chambers, MD, University of Washington, Seattle, Washington, United States of America**  
*Coral Ballroom, Ground Level*
- 10:45 AM – 11:00 AM 7.1 Occupational Safety and Health Administration (OSHA) Investigation of an Occupational Diving Death  
*Dawn Cannon, MD MS, Occupational Safety and Health Administration, Washington, District of Columbia, United States of America*

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

- 11:00 AM – 11:15 AM 7.2 Acute Esophageal Necrosis (AEN): 57 cases of "Black Esophagus" in a Medical Examiner Population  
*Michael Bell, MD, Palm Beach County Medical Examiner Office, West Palm Beach, Florida, United States of America*
- 11:15 AM – 11:30 AM 7.3 Dormant Volcanic Lake Gases: A Case Report of Two Mass Casualty Events  
*Rory Deol, DO, Oklahoma Office of the Chief Medical Examiner, Tulsa, Oklahoma, United States of America*
- 11:30 AM – 11:45 AM 7.4 The Intraluminal Migratory Enigma of a Gossypiboma.  
*Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada*
- 11:45 AM – 11:50 AM Questions
- 11:50 AM – 1:30 PM LUNCH (ON YOUR OWN) [NOT CME]
- 11:50 AM – 1:30 PM POSTER SESSION P33 and P67 – P99 [AUTHORS AT POSTERS 12:00PM – 1:00PM]
- 1:30 PM – 3:00 PM** **SESSION 8: TOXICOLOGY**  
**Moderators: Reade Quinton, MD, Mayo Clinic, Rochester, Minnesota, United States of America and Lauren Crowson, DO, MS, Medical University of South Carolina, Charleston, South Carolina, United States of America**  
*Coral Ballroom, Ground Level*
- 1:30 PM – 2:00 PM 8.1 Point-of-Care Testing for Drugs at Autopsy: A Presentation from the NAME Toxicology Committee  
*Laura Labay, PhD, NMS Labs, Horsham, Pennsylvania, United States of America*
- 2:00 PM – 2:20 PM 8.2 National Forensic Laboratory Information System (NFLIS) and Medical Examiner and Coroner Offices, the Virtual Resources Provided by NFLIS  
*Kelly Keyes, RTI International, Research Triangle Park, North Carolina, United States of America*
- 2:20 PM – 2:35 PM 8.3 Acute Respiratory Failure as a Consequence of Synthetic Cannabinoid Intoxication, Masquerading as Apparent Opioid Related Death.  
*Barry K. Logan, PhD, F-ABFT, NMS Labs, Horsham, Pennsylvania, United States of America*
- 2:35 PM – 2:55 PM 8.4 Novel Psychoactive Substance (NPS) Discovery: Evaluating the Rise and Fall of Novel Synthetic Opioids (NSO) and Other Novel Psychoactive Substances in Postmortem Toxicology in the United States  
*Barry K. Logan, PhD, F-ABFT, Center for Forensic Science Research and Education (CFSRE), Willow Grove, Pennsylvania, United States of America*
- 2:55 PM – 3:00 PM Questions
- 3:00 PM – 3:30 PM VISIT EXHIBITS [NOT CME]
- 3:00 PM – 3:30 PM BREAK [NOT CME]
- 3:00 PM – 3:30 PM VISIT POSTERS

- 3:30 PM – 5:10 PM**      **SESSION 9: PEDIATRIC AND FEDERAL/LEGAL**  
**Moderators: Reade Quinton, MD, Mayo Clinic, Rochester, Minnesota, United States of America and Lauren Crowson, DO, MS, Medical University of South Carolina, Charleston, South Carolina, United States of America**  
*Coral Ballroom, Ground Level*
- 3:30 PM – 3:40 PM      9.1 WITHDRAWN
- 3:40 PM – 4:00 PM      9.2 Intrinsic and Extrinsic Autopsy Findings in Sudden Unexplained Death in Childhood (SUDC)  
*Melissa Guzzetta, NYU Grossman School of Medicine, New York, New York, United States of America*
- 4:00 PM – 4:20 PM      9.3 Removing the Term “Unprintable” from the Medical Examiner/Coroner Dictionary (New Postmortem Fingerprinting Resources)  
*Bryan T. Johnson, MSFS, FBI, Quantico, Virginia, United States of America*
- 4:20 PM – 4:35 PM      9.4 National Missing and Unidentified Persons System (NamUs) and the National Center on Forensics: An National Institute of Justice Update  
*Chuck Heurich, MFS, National Institute of Justice, Washington, District of Columbia, United States of America*
- 4:35 PM – 4:50 PM      9.5 The National Institute of Justice’s (NIJ) Research and Development (R&D) Programs to Support the Medicolegal Death Investigation Community  
*Danielle L. McLeod-Henning, MFS, National Institute of Justice, U.S. Department of Justice, Washington, District of Columbia, United States of America*
- 4:50 PM – 5:05 PM      9.6 The Evolving Death Certificate from Paper to Electronic Format  
*Margaret Warner, PhD, CDC, National Center for Health Statistics, Takoma Park, Maryland, United States of America*
- 5:05 PM – 5:10 PM      Questions

## **TUESDAY, OCTOBER 19, 2021**

### **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 – 10:05 AM**      **SESSION 10: INTERNATIONAL AND PUBLIC HEALTH, ETC.**  
**Moderator: Catherine Miller, MD, Palm Beach County Medical Examiner, West Palm Beach, Florida, United States of America and Kristine Cavicchi, MS, MPA, aPHR, PHR, Office of the Chief Medical Examiner, Ashland, Massachusetts, United States of America**  
*Coral Ballroom, Ground Level*
- 8:00 AM – 8:10 AM      10.1 The Provision of Forensic Pathology Services in Trinidad and Tobago: Past, Present and Future  
*Catherine S. Morris, MD, Port of Spain General Hospital, Port of Spain, Trinidad and Tobago and Alfredo E. Walker, FRCPath, DMJ (Path), University of Ottawa, Ottawa, Ontario, Canada*

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

8:10 AM – 8:20 AM	10.2 Patterns and Prevalence of In-Custody Deaths and Disappearances in Sub-Saharan Africa <i>Ken Obenson, Horizon Health Network/Dalhousie University Saint John, Saint John, New Brunswick, Canada</i>
8:20 AM – 8:30 AM	10.3 WITHDRAWN
8:30 AM – 8:45 AM	10.4 Can We Come to the Same Conclusion? The Utility of Autopsy Findings When Determining Causes and Manners of Death <i>Daniel W. Dye, MD, University of Alabama at Birmingham Department of Pathology, Birmingham, Alabama, United States of America and Sarah E. DePew, MD, University of Alabama at Birmingham Department of Pathology, Birmingham, Alabama, United States of America</i>
8:45 AM – 9:05 AM	10.5 A Survey of Deaths due to Law Enforcement Intervention in Five Western Countries <i>Ken Obenson, Horizon Health Network/Dalhousie University Saint John, Saint John, New Brunswick, Canada</i>
9:05 AM – 9:20 AM	10.6 WITHDRAWN
9:20 AM – 9:40 AM	10.7 Assessing Mortality and Morbidity after Large-Scale Disasters: Recommendations from the National Academies of Science 2020 Report <i>Marcella F. Fierro, MD, Fierro Forensics, Henrico, Virginia, United States of America</i>
9:40 AM – 10:00 AM	10.8 Courtroom Testimony Training for Professional and Expert Witnesses: A Model <i>Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada</i>
10:00 AM – 10:05 AM	Questions
10:05 AM – 10:30 AM	BREAK [NOT CME]
<b>10:30 AM – 12:35 PM</b>	<b>SESSION 11: PUBLIC HEALTH, ETC.</b> <b>Moderator: Catherine Miller, MD, Palm Beach County Medical Examiner, West Palm Beach, Florida, United States of America and Kristine Cavicchi, MS, MPA, aPHR, PHR, Office of the Chief Medical Examiner, Ashland, Massachusetts, United States of America</b> <i>Coral Ballroom, Ground Level</i>
10:30 AM – 11:00 AM	11.1 Dr. Charles Hirsch: Mentor, Teacher, Researcher, and Certifier <i>James R. Gill, MD, CT Office of the Chief Medical Examiner, Farmington, Connecticut, United States of America and Susan F. Ely, MD, MPH, NYC Office of the Chief Medical Examiner, New York, New York, United States of America</i>
11:00 AM – 11:15 AM	11.2 Some Insights Into Expanding the Role and Enhancing the Meaning of Academic Forensic Pathology <i>Michael J. Caplan, MD, University of Michigan/Michigan Medicine, Ann Arbor, Michigan, United States of America</i>
11:15 AM – 11:30 AM	11.3 Quality Assurance in Forensic Pathology: The Approaches to Peer-Review <i>Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada</i>

NAME 2021 Annual Meeting  
Hilton West Palm Beach – West Palm Beach, Florida

11:30 AM – 11:45 AM	11.4 NAME Member Resources and Analytics <i>Steven C. Clark, PhD, Occupational Research and Assessment, Big Rapids, MI, United States of America</i>
11:45 AM – 12:00 PM	11.5 Into the Looking Glass: The Creation of Non-Physician Medical Examiners in Wisconsin <i>Jeffrey M. Jentzen, MD, PhD, University of Michigan, Ann Arbor, MI, United States of America</i>
12:00 PM – 12:30 PM	11.6 Here Today, There Tomorrow <i>Adam Denmark, SmithGroup, Phoenix, Arizona, United States of America</i>
12:30 PM – 12:35 PM	Questions
<b>12:35 PM – 2:30 PM</b>	<b>NAME Luncheon &amp; Awards Presentations (Registrants and Ticket Holders Only) [NOT CME]</b> <i>Oceana Ballroom, Ground Level</i>
<b>2:30 PM – 4:25 PM</b>	<b>SESSION 12: ADMINISTRATION</b> <b>Moderator: Katherine Maloney, MD, Erie County Medical Examiner's Office, Buffalo, New York, United States of America</b> <i>Coral Ballroom, Ground Level</i>
2:30 PM – 2:45 PM	12.1 A Novel Approach to Customer Service Management at the Office of the Medical Examiner: The Role of the Family Advocate <i>Bridget Eutenier, MD, Maricopa County Office of the Medical Examiner, Phoenix, Arizona, United States of America and Irma Cortes, BSW, Maricopa County Office of the Medical Examiner, Phoenix, Arizona, United States of America and Irma Cortes</i>
2:45 PM – 3:05 PM	12.2 Appeals of Manner and Cause of Death in Maryland <i>Bruce Goldfarb, Maryland Office of the Chief Medical Examiner, Baltimore, Maryland, United States of America</i>
3:05 PM – 3:25 PM	12.4 Medical Examiner/Coroner (ME/C) Case Management System Projects: A Process Review from Procurement to Implementation in Three Medical Examiner Offices Over a 10-year period <i>Karen Cline-Parhamovich, DO, Pierce County Medical Examiner's Office, Tacoma, Washington, United States of America</i>
3:25 PM – 3:40 PM	12.5 Results of the Automation of the Tissue Donor Referral Process in an Urban Medical Examiner's Office <i>Carl J. Schmidt, MD, University of Michigan - Wayne County, Detroit, Michigan, United States of America</i>
3:40 PM – 4:00 PM	12.6 Medicolegal Death Investigation, Virtually Ignored No More <i>Kelly Keyes, RTI International, Research Triangle Park, North Carolina, United States of America</i>
4:00 PM – 4:20 PM	12.7 Courtroom Testimony Training Through the Lens of a Director <i>Fernanda Henry, MSc (Forensic DNA), Saint Lucia Forensic Science Laboratory, Castries, Outside US, Saint Lucia</i>
4:20 PM – 4:25 PM	Questions
4:25 PM	Meeting Adjourns

**POSTER PRESENTATIONS:**

*Please note posters P1-P31 must be on the assigned board by Saturday, October 16 at 8:00 AM and remain posted until 5:00 PM. Posters P32-P64 must be on the assigned board by Sunday, October 17 at 8:00 AM and remain posted until 5:00 PM. Posters P65-P97 must be on the assigned board by Monday, October 18 at 8:00 AM and remain posted until 5:00 PM. NAME is not responsible for posters left on the board after 5:00PM on the day of your presentation.*

*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 – P31: Saturday, October 16, 12:00 PM – 1:00 PM

P32 – P64: Sunday, October 17, 11:30 AM – 12:30 PM

P65 – P97: Monday, October 18, 12:00 PM – 1:00 PM

**P1 Possible SARS-CoV-2-Induced Lymphocytic Myocarditis in a One-Year-Old**

*##Roshan Mahabir, MD, PhD, MPH, Children's Hospital Los Angeles, Los Angeles, California, United States of America*

**P2 Systemic EBV-Positive T-Cell Lymphoma of Childhood Causing Cardiac Myocarditis with Necrosis and Vasculitis**

*Roshan Mahabir, MD, PhD, MPH, Children's Hospital Los Angeles, Los Angeles, California, United States of America*

**P3 Virtual Pre-Autopsy Organ Recovery and Review**

*\*\*Damian M. Jackson, Southwest Transplant Alliance, Dallas, Texas, United States of America*

**P4 When Medication Kills: Antimalarial-Induced Cardiomyopathy**

*\*Brianna Flynn, MD, Vanderbilt University Medical Center, Hermitage, Tennessee, United States of America*

**P5 Retrograde Type A Aortic Dissection Masquerading as a Large Unilateral Pulmonary Embolism: A Lesson on Confirming Abnormal Ventilation/Perfusion Scans**

*\*David Negrete, MD, Cedars Sinai Medical Center, Los Angeles, California, United States of America*

**P6 The Role of the Forensic Pathologist in Aviation Deaths**

*\*Thomas Herb, MD, University of Michigan, Ann Arbor, Michigan, United States of America*

**P7 Abdominal Apoplexy Associated with Vascular Ehlers Danlos Syndrome (Type IV): Two Fatal Cases**

*\*Brittany Holden, DO, MS, BA, Baylor University Medical Center, Rowlett, Texas, United States of America*

**P8 Postmortem Molecular Testing: A Case Report on Genetic Diagnosis Based on Autopsy Findings**

*\*Daniel F. Gallego, MD, University of Washington, Seattle, Washington, United States of America*

**P9 A Case Report of Disseminated Congenital Cytomegalovirus Infection**

*\*Mehmoosh Ghandili, MD, Wake Forest Baptist Medical Center, Winston Salem, North Carolina, United States of America*

**P10 Postmortem Computed Tomography Findings in Scuba Deaths Due to Arterial Gas Embolism**

*\*Jia Jun Guan, MD, Los Angeles County Department of Medical Examiner-Coroner, Los Angeles, California, United States of America*

**P11 Death Due to Accidental Crossbow Arrow Injury: A Case Report and Review of the Literature**

*\*Michel Tawil, MD, SUNY Upstate Medical University, Syracuse, New York, United States of America*

**P12 Death by Choroid Plexus Tumor Infarction: A Rare Entity**

*\*Taryme Lopez Diaz, MD, University of Louisville Department of Pathology & Laboratory Medicine, Louisville, Kentucky, United States of America*

**P13 Improving Accuracy of Overdose Death Reporting**

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

**P14 The Utility of Postmortem Tryptase Levels in Intraoperative Anaphylaxis-Associated Deaths**

*\*Batoul A. Aoun, DO, Michigan Medicine, University of Michigan, Ann Arbor, Michigan, United States of America*

**P15 A Case of Advanced Lewy Body Disease and Alzheimer Disease in a Young Decedent with Reported History of Amyotrophic Lateral Sclerosis**

*\*Madeleine Opsahl, DO, University of Texas Southwestern Medical Center, Dallas, Texas, United States of America*

**P16 Tales from the Crypt: A Case Report of Disseminated Cryptococcosis and Review of the Literature**

*\*Lauren R. Crowson-Hindman, DO, MS, Medical University of South Carolina (MUSC), Charleston, South Carolina, United States of America*

**P17 Death Due to Air Embolism During Sexual Intercourse in a Pregnant Woman**

*\*Claire E. Rose, M.D., Milwaukee Medical Examiner's Office, Milwaukee, Wisconsin, United States of America*

**P18 Spontaneous Coronary Artery Dissection During the Peripartum Period: A 7.5-Year Review**

*\*Saleh Fadel, MD, BSc, University of Ottawa, Ottawa, Ontario, Canada*

**P19 Relapsing Polychondritis as a Cause of Sudden and Unexpected Death with Central Nervous System Involvement**

*\*\*\*\*Alexander S. Lokken, MSII, Rosalind Franklin University of Medicine and Science, North Chicago, Illinois, United States of America*

**P20 Multifocal Subcortical White Matter Infarcts as the Cause of Sudden Death in an African-American Male with Sickle Cell Trait**

*\*\*\*\*Sarah Genevieve Koutana, BS, Saint Louis University School of Medicine, St. Louis, Missouri, United States of America*

**P21 Splenic Rupture Due to Acute Hemorrhagic Pancreatitis: A Rare Cause of Hemoperitoneum at Autopsy**

*\*\*\*\*Skylar Weber, BS, BA, Coconino County Health and Human Services Medical Examiner's Office, Flagstaff, Arizona, United States of America*

**P22 Two Cases of Metastatic Melanoma at Forensic Autopsy**

*\*\*\*\*Julita Gongolli, BS, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America*

**P23 Cardiopulmonary Resuscitation-Related Hemorrhage Discovered at Forensic Autopsy**

*\*\*\*\*Samuel P. Prahlow, MPH, Philadelphia College of Osteopathic Medicine - South Georgia, Moultrie, Georgia, United States of America*

**P24 Death Following Poison Ivy Smoke Inhalation**

*\*\*\*\*Samantha L. Woolery, MS, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America*

**P25 Death as a Complication of Urologic Surgery: Two Cases Identified at Autopsy**

*\*\*\*\*Ernest Allen Morton, Western Michigan University Homer Stryker MD School of Medicine, Kentwood, Michigan, United States of America*

**P26 The Impact of the COVID-19 Pandemic on Deaths Due to Motor Vehicle Accident in the States of Maryland**

*\*\*\*\*Van Anh T. Nguyen, University of Maryland Baltimore Graduate School, Clarksburg, Maryland, United States of America*

**P27 Forensic Autopsy Cases with Eye Trauma**

*\*\*\*\*Trung Thanh Bui, MS, Philadelphia College of Osteopathic Medicine in South Georgia, Moultrie, Georgia, United States of America*

**P28 Use of Uncommon Methodologies to Extract and Interpret Medicolegal and Clinical Data**

*\*\*\*\*Lo Tamburro, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America*

**P29 An Analysis of the Suicide Demographics of the Eastern Ontario Regional Forensic Pathology Unit**

*\*\*\*\*Jaycie Dalson, BSc, University of Toronto, Toronto, Ontario, Canada*

**P30 The Pathology Club of the University of the West Indies**

*\*\*\*\*Ann-Marie Ming Hon, BMedSc, The University of the West Indies, St. Augustine, St. Augustine, Trinidad and Tobago*

**P31 Postmortem Point of Contact (POC) Urine Drug Screening with Quantitative Confirmation During COVID-19 Global Pandemic and Pros and Cons for Utility in Cause of Death or Manner of Death: A Pilot Study**  
*#William Ray Morrone, DO, MPH, MS, Office of the Medical Examiner for Arenac, Bay & Tuscola County, H.D., Bay City, Michigan, United States of America*

**P32 Unusual Origin of Fatal Vehicle Fire Related to Alcohol and Drug Intoxication**  
*Alison A. Lutz, BS, Tidewater-Office of the Chief Medical Examiner, Norfolk, Virginia, United States of America*

**P33 Sudden Death in a Young Woman with Systemic Lupus Erythematosus**  
*Meagan Chambers, MD, MS, MSc, University of Washington, Seattle, Wyoming, United States of America*

**P34 WITHDRAWN**

**P35 Case Report: Detection of Novel Psychoactive Drugs in the Context of Fentanyl and Heroin Use**  
*George S. Behonick, Ph., F-ABFT, Axis Forensic Toxicology, Indianapolis, Indiana, United States of America*

**P36 WITHDRAWN**

**P37 Sleep-Related Infant Deaths in Georgia: Are We Seeing Change?**  
*Michelle Ashley DiMarco, MD, Georgia Bureau of Investigation Medical Examiner's Office, Decatur, Georgia, United States of America*

**P38 Postmortem Fungal Growth in the Trachea Mimicking Antemortem Foreign Body Airway Occlusion**  
*Jamie E. Kallan, MD, Utah Office of the Medical Examiner, Taylorsville, Utah, United States of America*

**P39 Sudden Cardiac Death of a Child with Three Coronary Arteries Originating from the Right Sinus of Valsalva**  
*Peter Barrale, MD, Geisinger Medical Center, Danville, Pennsylvania, United States of America*

**P40 Virtual Education in Forensic Pathology: Wayne County Medical Examiner's Office Experience**  
*Eleftherios Vouyoukas, MSc, MD, Wayne County Medical Examiner's Office / University of Michigan, Detroit, Michigan, United States of America*

**P41 An Unusual Suicide by Sodium Azide**  
*Varsha Podduturi, MD, Harris County Institute of Forensic Sciences, Houston, Texas, United States of America*

**P42 Rare Case of Homicide by Air Gun with Bullet Embolism**  
*Justin Matthew Lohmann, DO, University of Tennessee Medical Center Knoxville, Knoxville, Tennessee, United States Of America*

**P43 Fulminant Hypereosinophilic Syndrome Consistent With Churg-Strauss Syndrome Presenting at Autopsy**  
*Justin Matthew Lohmann, DO, University of Tennessee Medical Center Knoxville, Knoxville, Tennessee, United States Of America*

**P44 Association Between Dementia Including Alzheimer Disease and Death Near Bodies of Water**  
*Marwan Majeed, MD, Vidant Medical Center/ East Carolina University, Greenville, Texas, United States of America*

**P45 Occult Presentation of Sinusoidal Diffuse Large B-Cell Lymphoma of the Liver Found at Autopsy**  
*Kathryn Rice, MD, University of Maryland Medical Center, Baltimore, Maryland, United States of America*

**P46 Effect of the COVID-19 Pandemic on Adolescent Suicides in Georgia**  
*Brittany Wilson, MS, Philadelphia College of Osteopathic Medicine, Snellville, Georgia, United States of America*

**P47 A Case of Fatal Very Late Stent Thrombosis Following Cessation of Clopidogrel**  
*Rosanna Drake, DO, University of Maryland Medical Center, Baltimore, Maryland, United States of America*

**P48 Sudden Death: Hypokalemia and Cardiac Arrhythmia Secondary to Conn's Syndrome**  
*Rosanna Drake, DO, University of Maryland Medical Center, Baltimore, Maryland, United States of America*

**P49 WITHDRAWN**

**P50 A Summary of Time Spent During One-Hundred Consecutive Courtroom Testimonies**  
*Joseph A. Felo, DO, Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, United States of America*

**P51 Rare Fatal Mycoplasma Pneumonia-Associated Encephalopathy in a Previously Healthy Adolescent: Case Report**

*Elicia Goodale, MD, Medical University of South Carolina, Charleston, South Carolina, United States of America*

**P52 The Impact of COVID-19 on the Illicit Drug Related Deaths in the State of Maryland**

*Kaitlyn Ann Gencarelli, BS, MS, University of Maryland-Baltimore, Nutley, New Jersey, United States of America*

**P53 Shocking Figures: A Series of Fatal Electrocutions Due to Fractal Wood Burning**

*Kelly Kruse, MD, MPH, Iowa Office of the State Medical Examiner, Ankeny, Iowa, United States of America*

**P54 The Value of the Postmortem Urine Drug Screen as an AIDE in Determining the Cause of Death**

*Scott Collier, MD, West Tennessee Regional Forensic Center, Memphis, Tennessee, United States of America*

**P55 Snowcapitation: Near-Decapitation by Snow Plow**

*Amanda Hersh, DO, University of Missouri, Columbia, Missouri, United States of America*

**P56 WITHDRAWN**

**P57 WITHDRAWN**

**P58 Postmortem Animal Predation of Human Genitalia: A Unique Case Presentation**

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

**P59 A Hidden Murder by Poisoning: Toxicology Investigation on a Buried Corpse**

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

**P60 Stillbirth Due to Umbilical Cord Hematoma**

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

**P61 Fatal Malignant Hyperthermia During Surgery: Then and Now**

*Lee Marie Tormos, MD, Palm Beach County Medical Examiner Office, West Palm Beach, Florida, United States of America*

**P62 A Case Series of Fatal Disseminated Neonatal Herpes Simplex Virus and a Call for Interdisciplinary Collaboration and Change**

*Michelle Nagurney, MD, Allegheny County Office of the Medical Examiner, Pittsburgh, Pennsylvania, United States of America*

**P63 Not To Be Outdone: The Persistence of Overdose-Related Deaths During the COVID-19 Pandemic in Maryland, Trends From 2019 to 2021**

*Nicole Harvilla, MD, Maryland Office of the Chief Medical Examiner, Baltimore, Maryland, United States of America*

**P64 SUID Tissue Consortium: Advancing Medical Research through Postmortem Tissue Donation**

*Christine D. Ikponmwonba, MPH, American SIDS Institute, Naples, Florida, United States of America*

**P65 WITHDRAWN**

**P66 A Rare Death Due to Bone Marrow Embolism**

*Rasmey Thach, DO, William Beaumont Army Medical Center, Fort Bliss, Texas, United States of America*

**P67 WITHDRAWN**

**P68 Adult Onset of Ornithine Transcarbamylase Deficiency: A Rare Medical Examiner Case**

*Lorenzo Gitto, MD, State University of New York, Upstate Medical University, Syracuse, New York, United States of America*

**P69 The Opioid Epidemic and Trends in Cook County During the COVID Pandemic**

*Lorenzo Gitto, MD, State University of New York, Upstate Medical University, Syracuse, New York, United States of America*

**P70 Do Economic Impact Payments Impact Drug Deaths?**

*Catherine R. Miller, MD, Palm Beach County Medical Examiner's Office, West Palm Beach, Florida, United States of America*

**P71 Sars-CoV-2 (COVID-19) Experience at an Academic Medical Examiners Office**

*Joseph A. Prahlow, MD, Western Michigan University University Homer Stryker MD School of Medicine, Kalamazoo, Michigan, United States of America*

**P72 Death Due to Colon Laceration Following Self-Sodomy: A Case Report**

*Lorenzo Gitto, MD, State University of New York, Upstate Medical University, Syracuse, New York, United States of America*

**P73 Texas Mike and the Snitch**

*Candace H. Schoppe, MD, Self-employed consultant, Grapevine, Texas, United States of America*

**P74 Shockingly Deadly: Streptococcal Toxic Shock Syndrome**

*Amanda Hersh, DO, University of Missouri, Columbia, Missouri, United States of America*

**P75 A Case of Fatal Infantile Head injury with Complex Biparietal Skull Fractures: Can an Accidental Short Fall from Parental Standing Height be the Explanation?**

*Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada*

**P76 Retractions and Publication Ethics in Forensic Pathology**

*Ken Obenson, MD, Dalhousie University/Saint John Regional Hospital, Saint John, New Brunswick, Canada*

**P77 Simplified DNA Barcoding Strategy for Forensically Relevant Blow, Flesh, and Scuttle Flies**

*Sam C Kwiatkowski, PhD, Harris County Institute of Forensic Sciences, Houston, Texas, United States of America*

**P78 A Semi-Permanent Solution: The Body Encased in Concrete**

*Amanda Hersh, DO, University of Missouri, Columbia, Missouri, United States of America*

**P79 WITHDRAWN**

**P80 Is Excited Delirium Underreported in Sub-Saharan Africa? A look at Two Countries with High Rates of Police Violence**

*Ken Obenson, MD, Dalhousie University/Saint John Regional Hospital, Saint John, New Brunswick, Canada*

**P81 WITHDRAWN**

**P82 To Publish or to Perish: Predatory Journals and the Budding Academic Forensic Pathologist**

*Ken Obenson, MD, Dalhousie University/Saint John Regional Hospital, Saint John, New Brunswick, Canada*

**P83 A Partnership to Consider: How Pathologists' Assistant Training Can be Utilized to Decrease the Forensic Pathologist Workload**

*VeraLucia Mendes-Kramer, MA, American Association of Pathologists' Assistants, St. Paul, Minnesota, United States of America*

**P84 Beta-Blockers in Overdose: Metoprolol Concentrations in Postmortem Investigations, 2020-Q1 2021**

*Stephanie M. Marco, PhD, NMS Labs, Horsham, Pennsylvania, United States of America*

**P85 WITHDRAWN**

**P86 Increasing Prevalence of Gabapentin in Fatal Drug Overdoses**

*Thomas Gilson, MD, Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, United States of America*

**P87 Rapid DNA Identification of Human Remains: An Overview of Research and a Path to Implementation**

*Melissa R. Schwandt, PhD, ANDE Corporation, Longmont, Colorado, United States of America*

**P88 The Impact of Skin Color on the Identification of Blunt Force Injuries**

*Christian Jordan Santiago, BS, The George Washington University, Washington, District of Columbia, United States of America*

**P89 The Art of the Review: How to Avoid being the Dreaded "Reviewer #2"**

*Ken Obenson, MD, Dalhousie University/Saint John Regional Hospital, Saint John, New Brunswick, Canada*

**P90 Loss of Nuclear Basophilic Staining as a Postmortem Interval Marker**

*Samah Alabbasi, MBBS, MFS, George Washington University, Baltimore, Maryland, United States of America*

**P91 Fatal Iatrogenic Cardiac Tamponade: An Unreported Complication of Laparoscopic Cholecystectomy**

*Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada*

**P92 Fatal Iatrogenic Cervical Spinal Cord Injury in an Adult Man: A Case Report**

*Alfredo E. Walker, FRCPath, DMJ (Path), MBBS, University of Ottawa, Ottawa, Ontario, Canada*

**P93 Conducted Electrical Weapon Temporally-Related Deaths: Case Reviews of Medicolegal Death Investigations and Autopsies with Manner of Death Considerations**

*Theodore T. Brown, MD, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan, United States of America*

**P94 A Simple Sodium Nitrite Test for Death Investigators**

*Laura Labay, PhD, NMS Labs, Horsham, Pennsylvania, United States of America*

**P95 Beta-Hydroxybutyric Acid and Hemoglobin A1C as Postmortem Diagnostic Markers of Diabetic Ketoacidosis**

*Laura Labay, PhD, NMS Labs, Horsham, Pennsylvania, United States of America*

**P96 WITHDRAWN**

**P97 Sudden And Unexpected Death In Infancy: SARS-COV-2 as an Unexpected but Important Etiology**

*Barbara Stroh van Deventer, MS, University of Pretoria, Pretoria, Gauteng, South Africa*

**NOTES**

## **Exhibit Schedule**

### **Exhibit Installation**

Friday, October 15 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 15 10:00AM – 4:00PM

Saturday, October 16 7:00AM – 5:00PM

Sunday, October 17 7:00AM – 5:00PM

Monday, October 18 7:00AM – 5:00PM

### **Overall Exhibit Hall Hours**

Friday, October 15 5:30PM – 9:00PM

*(Exhibits Open During Opening Reception and Welcome Dinner)*

Saturday, October 16 8:00AM – 3:30PM

Exhibit Hall Open: OPTIONAL

6:45AM – 8:00AM

*Breakfast will be served in the Exhibit Hall*

Sunday, October 17 8:00AM – 3:30PM

Exhibit Hall Open: OPTIONAL

6:45AM – 8:00AM

*Breakfast will be served in the Exhibit Hall*

Monday, October 18 8:00AM – 3:30PM

Exhibit Hall Open: OPTIONAL

6:45AM – 8:00AM

*Breakfast will be served in the Exhibit Hall*

### **Published Visiting Hours**

Friday, October 15 5:30PM – 9:00PM

Saturday, October 16 10:05AM – 10:30AM

3:00PM – 3:30PM

Sunday, October 17 9:30AM – 10:00AM

3:00PM – 3:30PM

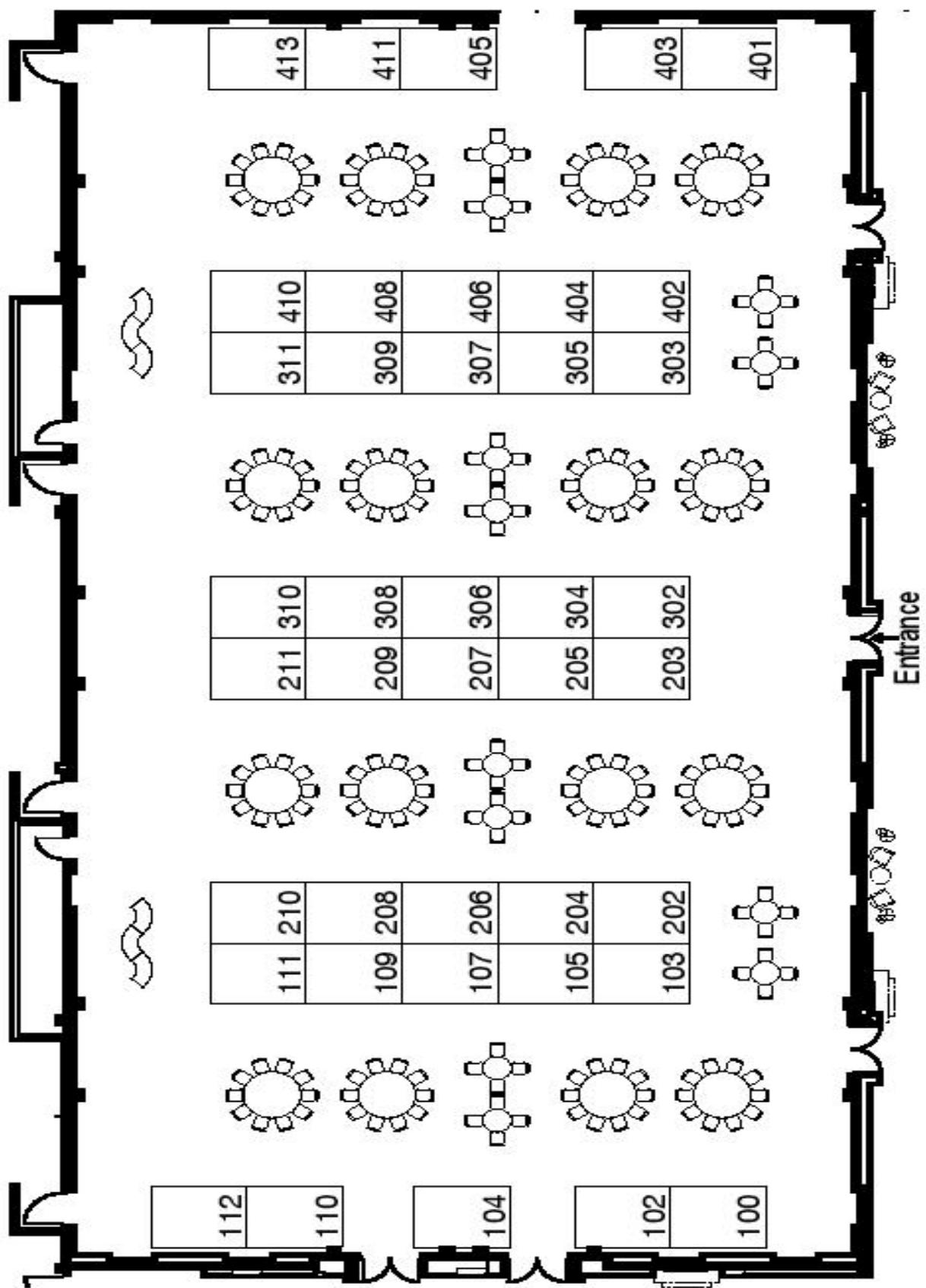
Monday, October 18 10:00AM – 10:45AM

3:00PM – 3:30PM

### **Exhibit Dismantling**

Monday, October 18 3:30PM – 9:00PM

*\*No packing or dismantling of exhibits will be permitted until 4:00PM, Monday, October 18. 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.*



## EXHIBITOR DESCRIPTIONS

### **ADANI Systems, Inc. (BOOTH # 103)**

ADANI Systems, Inc. was established in 2006 and is a leading Full Body Screening and X-ray Technology Systems supplier in the United States. Our innovative FORENSIC FULL-BODY SCANNER FOR AUTOMATIC X-RAY IMAGE CAPTURE WITHOUT MOVING OR TOUCHING THE OBJECT. ADANI is committed to delivering quality products with the best performance, reliability, and value. Our technology is compliant with ANSI 43.17 2009 and ETL standards, highlighting product safety and ensuring that the equipment safely uses as standard procedure for Medical Examiners and Forensic Services.

For more information visit: <https://adanisystems.us/>

### **Advanced Detection Solutions, LLC (BOOTH # 401)**

Comprehensive autopsy radiography solutions. 1) Post-mortem CT (PMCT) solutions, that help: i) enhance traditional autopsies, ii) assist in case of shortage of forensic pathologists and iii) where there are no forensic pathologists at all. Our PMCT solutions are modular (a) CT scanners (reconditioned and NEW) ; b) ForensicPACS™ ; c) CT Operations training ; d) Forensic imaging protocols, e) CT Trailers, and more. Bariatric and infant friendly. Low cost of ownership. 2) FOBOS™ whole-body digital forensic scanner. AP / Lateral views.

For more information visit: <https://detection-solutions.com/>

### **American Academy of Forensic Sciences (BOOTH # 107)**

A multidisciplinary professional organization that provides leadership to advance science and its application to the legal system. The objectives of the Academy are to promote professionalism, integrity, competency, education, foster research, improve practice, and encourage collaboration in the forensic sciences.

For more information visit: <https://www.aafs.org/>

### **American Association of Pathologists' Assistants (BOOTH # 306)**

The American Association of Pathologists' Assistants is dedicated to furthering the PA profession by providing members with targeted CE, professional support, and advocacy. Over 2000 certified and exam eligible members have met the highest standards for education and training in surgical and autopsy pathology, ensuring your pathology laboratory is meeting the standards of accreditation, licensing, and expectations of medical staff.

For more information visit: <https://www.pathassist.org/>

### **Axis Forensic Toxicology (BOOTH # 402)**

Axis - your industry-leading partner, approaching forensic toxicology needs from every angle. - Unmatched accuracy, accessibility, transparency and accountability - Leader in designer drug testing and research & development - Direct access and communication with our team of experts - Forensics – the center of our work since 1990 Ask how Whole Case Approach and Analyte Assurance™ can help your casework!

For more information visit: <https://axisfortox.com/>

### **Forensic Advantage (BOOTH # 209)**

Forensic Advantage® Medical Examiner Edition is an easy to use case management and reporting solution that optimizes how medical examiner and coroner offices are managed and operated. Stop by and talk to one of our team members about our CMS, toxicology batch processing and cloud deployment options.

For more information visit: <https://caliberpublicsafety.com/>

### **Forensic Radiology Group (BOOTH # 403)**

A highly dedicated team of forensic radiologists that help enhance traditional autopsies and help where there is a shortage of forensic pathologists or no forensic pathologists at all. Our services include: a) Audit Services (Quality Assurance [CT image reads] ; Modality and Mortality conferences ; b) Consultant Services (Non-primary reads) ; c) Consulting Projects (Education package ; Review systems) ; d) Forensic Reports (Primary CT image reads with findings reports) ; e) Skeletal Surveys ; f) Identifications, and more.

For more information visit: <https://www.forensicradiologygroup.com/>

### **Global Emergency Response (BOOTH # 307)**

GER provides software applications for the tracking of decedents. Modules include a Mass Fatality mobile tracking system and a Decedent Tracking system for in-morgue operations. The software includes mapping, charting, dashboarding, and reporting, and can integrate with existing case management systems.

For more information visit: <https://www.ger911.com/>

**LifeSign (BOOTH # 304)**

Manufacturer and distributor of rapid point-of-care tests including drug and abuse and fentanyl  
For more information visit: <https://www.lifesignmed.com/>

**Lodox Systems (BOOTH # 303/305)**

Introducing eXero-dr- rapidly evident. North America's most trusted full-body, high-speed, digital radiology solution designed 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 <http://lodox.com/forensics/>

**McClaren, Wilson & Lawrie, Inc. (BOOTH # 203)**

McClaren, Wilson & Lawrie, Inc. is a leader in architecture specializing in the forensic sciences and law enforcement. MWL offers master plans, needs assessments, site feasibility studies, budget development, design services and construction administration. With offices nationwide, MWL has completed over 300 public safety and 140 forensic facilities in 46 states.

For more information visit: <https://www.mwlarchitects.com/>

**MolecularDx (BOOTH # 405)**

MolecularDx is a forensic laboratory with a vision – to enhance the connection between state-of-the-art laboratory testing and the investigators that depend on laboratory results. Our toxicology tests are dynamically designed around customer's needs with a comprehensive panel profile that prioritizes turnaround times, and our DNA testing provides timely, accurate results, even with low quality samples.

For more information visit: <https://www.molecdx.com/>

**Mopec (BOOTH # 302)**

Mopec provides American-made equipment and laboratory products to the pathology, histology, necropsy, autopsy and mortuary 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: <https://www.mopec.com/>

**Mortech Manufacturing (BOOTH # 105)**

Mortech Manufacturing has provided quality postmortem laboratory equipment and instruments to facilities since 1985, serving the pathology, autopsy, necropsy, veterinary, morgue, and mortuary industries. Mortech is an ISO 9001:2015 certified company with an NSF certification. We adhere to all Leed Green, UL, CE standards and are proud to be a part of the MADE IN THE USA tradition.

For more information visit: <https://mortechmfg.com/>

**Neurologica (BOOTH # 205/207)**

NeuroLogica, the healthcare subsidiary of Samsung Electronics Co. Ltd., develops, manufactures, and markets innovative imaging technologies and is committed to delivering fast, easy, and accurate diagnostic solutions to healthcare providers. NeuroLogica, the global corporate headquarters and manufacturer of computed tomography, is also the US headquarters for sales, marketing, and distribution of all Samsung digital radiography and ultrasound systems. Our advanced medical technologies are used worldwide in leading healthcare institutions, helping providers enhance patient care, improve patient satisfaction, and increase workflow efficiency. Samsung is committed to being a leader in the field of healthcare imaging.

For more information visit: <https://www.neurologica.com/>

**NMS Labs (BOOTH # 100/102)**

NMS Labs is an international forensic and clinical reference laboratory that is unsurpassed in its scope of toxicology tests, accuracy of results, scientific expertise, and innovation. The state-of-the-art headquarters includes clinical, forensic and research facilities, a dedicated and secure crime laboratory, and is staffed by more than 350 highly trained professionals. NMS Labs is passionate about promoting public health and safety.

For more information visit: <https://www.nmslabs.com/>

**Pierce County Medical Examiner Office (BOOTH # 308)**

Pierce County Medical Examiner's Office is attending as an exhibitor to meet Forensic Pathologists who may be interested in an Associate Forensic Pathologist role.

For more information visit: <https://www.piercecountywa.gov/113/Medical-Examiner>

**Randox Toxicology (BOOTH # 309)**

Randox Toxicology is dedicated to advancing forensic, clinical and workplace toxicology. With over 35 yearsâ€™™ experience in diagnostics, Randox focuses heavily on R&D in new products to develop technology at the forefront of global diagnostics. Trusted by market leaders to deliver accurate and reliable results. Randox offers screening platforms for blood, urine, oral fluid, meconium, vitreous humor and hair.

For more information visit: <https://www.randoxtoxicology.com/>

**Scimedico, LLC (BOOTH # 208)**

Scimedico is a laboratory services firm specializing in the fields of pathology, histology, and cytology. Scimedico's turnkey preventive maintenance, compliance, and implementation solutions are easily managed on our Complilab.com platform. To learn more about our services and technology solutions visit [www.scimedico.com/impact](http://www.scimedico.com/impact).

For more information visit: <https://www.scimedico.com/>

**Spire Integrated Solutions (BOOTH # 204)**

As a leading manufacturer of morgue, autopsy & pathology equipment, Spire Integrated Solutions is trusted by hospitals, clinics, laboratories, morgues, medical examiners and other healthcare and life science organizations to deliver reliable equipment solutions. Our CSI Jewett line of products is essential to healthcare and laboratories worldwide.

For more information visit: <https://www.spire-is.com/>

**Tissue Techniques Pathology Labs LLC (BOOTH # 202)**

We offer forensic histology services H&E, Special stains and immunohisto stains.

For more information visit: <http://tissuetechpathology.com/>

**Transplant Connect (BOOTH # 206)**

As the clinical, communications, tracking and analytics hub for nearly 75% of all U.S. deceased donation and transplant facilitation, the iTransplant Platform continues to expedite, improve and increase donation and transplantation, allowing Donor Hospitals, OPOs and Transplant Centers to elevate their performance and to save and heal more lives. In 2021, Transplant Connect is excited to introduce a number of innovative breakthroughs, including expansion of our groundbreaking iReferral Technology – we invented the automated donor referral and now we're perfecting it.

For more information visit: <https://transplantconnect.com/>

**Anatamage (BOOTH # 211)**

The Anatamage Table features high accuracy contents that offer an excellent replacement to traditional cadaver-based dissection. The Digital Anatomy Library offers over 1,300 clinical cases with a variety of visualization options. The Anatamage eBook provides interactive online learning for teachers and students who wish to study our digital cadaver remotely.

For more information visit: <https://www.anatamage.com/table/>

**NOTES**

## OPTIONAL MEETINGS/ACTIVITIES

### OPTIONAL SATURDAY NAME FOUNDATION FREE WILL DONATION IN HONOR OF RANDY HANZLICK

CASH BAR AVAILABLE



Date: Saturday, October 16, 2021  
Location: Hilton West Palm Beach, West Palm Beach, Florida  
Time: 8:00 PM to 10:00 PM

On behalf of the NAME Foundation Board of Trustees, I would like to announce the sixth annual Saturday evening NAME Foundation fundraising event, to be presented in conjunction with the NAME Annual Meeting in West Palm Beach, FL.

This year's event will be an event to honor Randy Hanzlick. Please join us on Saturday evening! The event will be recorded for viewing at a later date for persons unable to attend in person.

NOTE: For those who have already registered for the planned lecture by Jeff Jentzen on the Dahmer case which had been scheduled for this time, please note that Dr. Jentzen has requested that his talk be put on hold due to COVID concerns. It is hoped that the talk will be able to be rescheduled for the 2022 Annual meeting. If you have already purchased a ticket and registered, your ticket will be honored at that time. Please remember that the Foundation is a 501c3 organization and thus any donations may be considered to be a tax deductible contribution. However, if you desire a refund, you may contact the Foundation Secretary.

### OPTIONAL SUNDAY 23rd RIGOR RUN/WALK [NOT CME]

Date: Sunday, October 17, 2021  
Time: 6:00 AM – 8:00 AM  
Cost: \$25.00 per person



Event description: 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 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 26th ANNUAL CADAVER OPEN GOLF TOURNAMENT [NOT CME]

Date: Sunday, October 17, 2021  
Time: 12:00 Noon  
Cost: \$35.00 per player



The 2021 Cadaver Open will be held at the Park Ridge Golf Course (<https://www.pbcparkeidgegolf.com/>) One of the most unique golf courses in South Florida, Park Ridge golf courses offers elevation changes like no where else in the area. Built by Palm Beach County and the Solid Waste Authority on a retired landfill, Park Ridge tops 85 feet at its highest point. The unique set-up of the course includes six par 3s, six par 4s and six par 5s. This course is about a 30 min drive from the meeting hotel. The cost is \$35 per golfer.

Rental clubs are available: Wilsons for \$20 plus tax/set (does not include balls or tees) and new Cleveland for

\$50 plus tax/set (includes balls and tees). To reserve the clubs please contact Dee McNally at [name@thename.org](mailto:name@thename.org). Payment will be made October 17<sup>th</sup> at the Pro Shop.

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](mailto:dcwinston@gmail.com) to let 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. **The deadline to sign up for the Cadaver Open is Friday September 24.**

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

**CME: 1**

Date: Monday, October 18, 2021

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 18, 2021

Time: 12:00 PM – 1:30 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!



## **National Association of Medical Examiners**

### **Abstracts of the 2021 Annual Meeting**

**October 15 – 19, 2021**

**Hilton West Palm Beach**

**West Palm Beach, Florida**

## NOTES

National Association of Medical Examiners

Abstracts of the 2021 Annual Meeting

October 15-19, 2021

Hilton West Palm Beach, West Palm Beach, Florida

ORAL PRESENTATIONS

**1.1 Proliferation of Novel Synthetic Opioids in Postmortem Investigations Post Core-Structure Scheduling for Fentanyl**

*D.M. Papsun<sup>1</sup>, A.J. Krotulski<sup>2</sup>, B.K. Logan<sup>1</sup>*

<sup>1</sup>NMS Labs, Horsham, Pennsylvania, USA; <sup>2</sup>Center for Forensic Science Research & Education, Willow Grove, Pennsylvania, USA

The current wave of the US opioid epidemic began around 2013 with the illicit production of fentanyl and was later characterized by the spread of fentanyl analogs (e.g., acetylfentanyl, 2-furanylfentanyl) and non-fentanyl related synthetic opioids (e.g., U-47700). In response, core-structure scheduling of fentanyl-related substances was enacted in 2018 to curb the spread of fentanyl analogs. As a result, there is now a greater shift towards novel opioids with varied chemical structures that still retain high levels of opioid activity. Novel synthetic opioids (NSO) are agonists at the  $\mu$ -opioid receptors, resulting in analgesia, sedation, and respiratory depression. This category now includes 2-benzylbenzimidazoles (e.g., isotonitazene, metonitazene), benzimidazolones (e.g., brophine), and cinnamylpiperazines (e.g., AP-238).

A pivot in the NSO market, from predominantly fentanyl analogs to more varied subclasses, occurred around mid-2019. The earliest case involving isotonitazene in postmortem casework occurred in April 2019 in Iowa, however, a true increase in prevalence did not occur until August 2019, centralized around Indiana and Illinois. By April 2021, a total of 144 cases had been quantitatively confirmed for isotonitazene, with mean and median blood concentrations of  $1.8 \pm 3.8$  ng/mL and 1 ng/mL (range: 0.14-39 ng/mL) respectively. Isotonitazene positivity began declining following scheduling in June 2020, and the first confirmed cases of brophine were identified the same month in Minnesota and Illinois. Brophine has been quantitatively confirmed in 99 cases, with mean and median blood concentrations of  $3.8 \pm 11$  ng/mL and 1.1 ng/mL (range: 0.1-110 ng/mL). Metonitazene, a new 2-benzylbenzimidazole analog of isotonitazene, emerged later in 2020 and its increased positivity coincided with the decline in brophine positivity after scheduling in December 2020. As of April 2021, metonitazene has been quantitatively confirmed in 24 cases, with mean and median blood concentrations of  $5.6 \pm 6.4$  ng/mL and 3.3 ng/mL (range: 0.52-33 ng/mL). Isotonitazene, brophine, and metonitazene continue to appear in toxicological casework, but metonitazene is still increasing in positivity. In addition to these NSOs, 2-methyl AP-237 and AP-238 have been confirmed in postmortem casework between 2020 and 2021.

The lifespan of the newer NSOs appears to be shortening compared to earlier generations, probably due to improved surveillance, faster reporting, and dissemination of data to public health and safety stakeholders. The increased variation in NSO structures poses significant challenges to toxicology laboratories, and high-resolution screening methods are a vital tool for their identification. Vigilance by testing laboratories is essential in maintaining an up-to-date scope.

**1.2 Clonazepam Intoxication Case Report: Danger of Designer Benzodiazepines**

*C. Moore<sup>1</sup>, J.L. Hammers<sup>1</sup>, P. Marshall<sup>1</sup>*

<sup>1</sup>Duquesne University, Lansdale, Pennsylvania, USA

Clonazepam is a derivative of the Xanax active ingredient, alprazolam. Classified as a designer benzodiazepine, clonazepam availability has been rising due to its circulation on illegal internet drug markets and marginal cost in comparison to its parent analogs. clonazepam's accessibility encourages abuse prevalence and use of counterfeit benzodiazepines. In our case, a 14-year-old male was found unresponsive the morning after ingesting multiple tablets believed to be Xanax. Toxicology testing indicated 140 ng/mL of 8-aminoclonazepam, a clonazepam metabolite, in the decedent's system. Alprazolam was not identified. Pathological analysis determined cerebral and respiratory depression to be the mechanism of death resulting from acute clonazepam intoxication. Current literature identifies a gap in designer benzodiazepine confirmatory testing and a lack of awareness within the forensic and medical communities. Knowledge on counterfeit psychoactive substances is needed to better understand their potency and to help prevent future intoxications. We present this case to aid in the recognition of novel benzodiazepines by medical examiners and coroners, to encourage their consideration in Xanax and other substance related investigations, and to be aware of the capabilities of toxicological testing to improve novel benzodiazepine interpretation and subsequent identification.

**1.3 The Importance of Forensic Toxicology Testing of Hospital Admission Samples in Delayed Suspected Intoxication Deaths**

*D. Turbiville<sup>1</sup>, M.E. DeJoseph<sup>2</sup>, M. Clark<sup>2</sup>, J.R. Gill<sup>2</sup>*

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**Introduction:** Toxicological analysis is a standard ancillary test in medicolegal death investigation. For suspected intoxication deaths, it assists in determining the cause of death and allows for reporting the specific substances involved. Toxicology results in traumatic deaths are important to certain stakeholders even though an intoxication may not make a physiological contribution to death. Autopsy sample testing, however, may not accurately represent the concentrations of intoxicants at the time of the injury in delayed deaths.

**Materials and Methods:** The Connecticut Office of the Chief Medical Examiner routinely contacts hospital laboratories, requests a "hold," and retrieves admission blood/urine samples for traumatic and suspected intoxication deaths that have survived greater than one hour. From 2017 to 2020, we acquired hospital specimens for 1017 deaths. Of these deaths, there were 581 accidents (including 342 intoxications, 88 drivers, 44 pedestrians), 221 naturals, 98 suicides, and 81 homicides.

**Results:** There were 247 accidental drug intoxication deaths diagnosed, with survival intervals from 12 to 340 hours (average 64 hours). Fentanyl was detected in 193 (blood), 6-monoacetylmorphine in 20 (blood or urine), cocaine in 11 (blood), cocaine/benzoyllecgonine in 12 (urine), and ethanol in 52 (BAC 0.012 to 0.34 gm %).

Discussion: Toxicology testing is vital to diagnose intoxication deaths and has important legal and public health ramifications in traumatic deaths. During survival intervals, drugs continue to be metabolized; therefore, autopsy samples may not reflect the concentrations during the acute event/injury. Other challenges with toxicological interpretation involving survival intervals include detection of hospital administered medications, postmortem redistribution, and a limited scope of hospital toxicology testing (commonly urine screens), which do not meet forensic standards (no confirmatory/quantitative testing). Some hospitals do not include fentanyl in their urine screen. In addition, some patients use drugs during hospitalization, so a review of the medical records, including the medication administration record, may indicate the need for testing of autopsy samples as well. Hospital laboratories will usually hold these specimens for forensic investigations. Medicolegal investigators successfully facilitate this when a delayed death is reported. They know to contact the blood bank even if chemistry/hematology labs no longer have retained samples. We document the type of tube so we are prepared to explain why only benzoylcegonine may be detected in a particular sample. For interpretation, the draw date/time of the hospital samples are documented and correlated with the investigative information. This testing benefits stakeholders investigating these deaths and working in public health.

#### 1.4 WITHDRAWN

#### 1.5 The Manhole Murders: An Examination of Mortality Risk in Homeless Individuals

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Homelessness is a major problem in the US, with over 500,000 people experiencing homelessness on any given night and about 200,000 unsheltered. Higher mortality rates in homeless individuals are associated with unsheltered status, substance abuse, psychiatric conditions, underlying medical conditions, and cold exposure. There are many opportunities for risk mitigation regarding mortality rates in people experiencing homelessness.

In this presentation, we examine a case series of the homicides of four men experiencing homelessness. The victims were discovered in two separate manholes, and on autopsy the cause of death in all four cases was determined to be craniocerebral trauma. The homicide victims had all lived in an abandoned building together, and they were attacked by two other residents because the four had taken a space heater. We will explore the multiple risk factors at play in these homicides and discuss lessons that can be learned.

One of the roles of forensic pathologists is to identify risk factors for mortality and determine ways to increase community health. The high mortality rates associated with homelessness make it important to study this population. The presented case demonstrates how substance abuse, unsheltered status, and cold exposure can contribute to mortality. By examining the patterns involved in the deaths of people experiencing homelessness, we can make recommendations for policies to mitigate mortality risk in the homeless population.

#### 1.6 What's Old is New Again: The Reemergence of para-Fluorofentanyl

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Following nearly four decades of obscurity, a fentanyl analog never intended for human use, para-fluorofentanyl (pFF), is once again appearing in the illicit drug market. Para-fluorofentanyl is a  $\mu$ -opioid receptor agonist with a potency ratio to fentanyl of approximately 30%. Recently, as part of an opioid surveillance project, our laboratory has identified pFF in 33 postmortem cases. This is remarkable considering that pFF was not detected in any postmortem specimens analyzed under the project from January 2018 through September 2020 (n=5267 postmortem cases). The 33 pFF positive cases represent encounters from 12 counties in southwest Michigan and one county in northern Indiana over a six-month period (October 2020 to March 2021). The rate of pFF encounters for the entire study period was less than one percent (0.62%) but was 3.4% over the last six months of the study. For every case studied, additional drugs were also detected, suggesting the possibility of intentional incorporation of pFF with other drugs.

A liquid chromatography tandem mass spectrometry (LC/MS-MS) analysis that included pFF plus 42 additional opioids and five non-opioids was performed on each postmortem sample. Sample preparation for LC-MS/MS was conducted via solid phase extraction. Analysis was performed on blood (33 of 33 cases), vitreous fluid (19 of 33 cases), and submandibular salivary gland (one of 33 cases). Chromatographic peak retention time, transition mass information, and peak areas ratios were used to qualitatively identify targeted analytes. Nineteen of 33 cases (57%) were sent to an external reference laboratory for confirmatory analysis and quantification. Para-fluorofentanyl concentrations for these 19 cases ranged from 0.09 to 48 ng/mL; mean 8.5 ng/mL; median 1.4 ng/mL. The pharmacokinetics and pharmacodynamics of pFF are not fully understood and established concentrations for toxic and fatal concentrations of pFF are nonexistent; thus, medical examiners are advised to consider the potential contribution of pFF in the cause of death.

Our study details the encounter, reemergence, and likely spread of pFF despite it being in vogue in the United States for only a brief period during the early 1980s. This study also highlights the importance of drug surveillance as an informational tool to bring awareness to the new and not so new substances appearing in the illicit drug market.

#### 1.7 How Does a Mass Casualty Event Impact Staff of the Coroner's Office and is Meditation an Effective Tool for Mediating These Impacts?

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Introduction: On October 1, 2017, in Las Vegas, Nevada, a gunman opened fire at a crowd of approximately 22,000 people, killing sixty and injuring over seven-hundred. This event's psychological impact was felt heavily by many members of the medical community, including medical examiners and staff of the local coroner's office. The purpose of this small, observational pilot study was to evaluate how impactful the event, as well as working at the coroner's office in general, is on mental health and to test the hypothesis that guided mindfulness meditation is an effective method for reducing the negative impact of the associated stressors. Meditation has been shown to help regulate the stress response, with some recommendations of integration into conventional health care and wellness models.

Methods: Staff members were observed during a 10-week period, where they participated in three meditation sessions per week, which were led by experienced instructors. Participants were interviewed before and after the 10-week period to discuss the psychological, emotional, and physical

effects of their job and October-1, as well as the effects of meditation. Participants were also asked to complete hand-written surveys with instruments such as the Beck Anxiety Inventory, Effects of Meditation Scale, and Brief Symptom Inventory.

**Results:** Both qualitative and quantitative data were assessed in this study. Post-traumatic stress symptoms, specifically hypervigilance, avoidance, re-experiencing, and distressing or intrusive thoughts, were prevalent during the interviews. Results from surveys and scales were analyzed separately via resampling with the bootstrap method, using 10,000 bootstrap samples and a 95% confidence interval. Statistically significant decreases in Beck Anxiety Inventory ( $p < 0.05$ ) and Brief Symptom Inventory ( $p < 0.05$ ) questionnaire scores were seen after the observational period.

**Conclusion:** Meditation was associated with a decrease in reports of anxiety and symptoms of post-traumatic stress in the local coroner's office staff. The data from this study underscore the necessity to consider the mental health of employees of coroner's offices around the country, particularly after mass fatality events, but also during day-to-day duties. Further, this study provides evidence that meditation may be a useful tool in meditating the adverse effects noted. The study also implicates the need for additional studies to evaluate the utility of meditation in managing chronic stress in the general population.

### **2.1 Analyzing acute reactions in the loss of a loved one and expectations from a Coroner's Office.**

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The loss of a loved one is one of the most stressful life events that one can experience and can cause major emotional and behavioral changes in people. When a death takes place, the people closest to the deceased can experience a wide range of emotions, not only in unexpected deaths, but even in the expected deaths.

The survey was carried out to find out what were the initial feelings the participants had during the loss of their loved ones, to whom they prefer to talk/be with and their expectations from the Coroner's Office to overcome their grieving reaction .

The study setting was at the Marion County Coroner's Office, 521 West McCarty Street, Indianapolis, Indiana, US. Ethical clearance was obtained from the Chief Coroner before conducting the survey. The study design was a cross sectional study. The study population were relatives or friends who came into the Marion County Coroner's Office or who called over the phone to get information about the death of the deceased person between 11-9-2020 and 12-20-2020. The participants who voluntarily participated were included in the survey. The participants were given a preformed questioner to be answered. The total number of participants who participated in the survey was 57.

Most of those individuals described their initial response as "shock" when they heard the loss of their loved one. Loss of appetite, lack of sleep, headache and chest pain were the common symptoms experienced by the participants. Most felt emotion was "sadness". 66.66% of participants said they wanted to be with family. This demonstrates the value of family support. Interestingly, none responded that they wanted to speak with a health care professional (e.g., psychiatrist).

Seventy-seven percent of the participants believed that the Coroner's Office cannot help . Participants who believed that the office could help them were asked an open-ended question and they all specifically stated that this could be done by giving the cause of death as soon as possible, so they could understand how their loved one died. Approximately 46% of the

participants believed that speaking with the forensic pathologist would help them deal with their grief.

The findings of the above survey can be used for future research and building upon a new hypothesis. The survey reiterates the importance of family support in the loss of a loved and importance of communication to the bereaved relatives by the forensic pathologist.

### **2.2 Caribbean Pathology and Laboratory Medicine Student Initiative**

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The island states of the Caribbean have all suffered a chronic shortage of specialists and subspecialists in pathology and laboratory medicine (PALM). Some territories do not have a trained forensic pathologist and rely on anatomical pathologists to perform medicolegal postmortem examinations.

The Caribbean Pathology and Laboratory Medicine Student Initiative was established as a collaborative effort between the Pathology Club of the University of the West Indies (Pathology Club of UWI) and its advisory board members to stimulate interest in PALM among undergraduate medical students of the UWI. Pathology and Laboratory Medicine is not a well-represented postgraduate specialty within the Caribbean, and most medical graduates in the region choose to pursue postgraduate training in the more traditional specialties. This initiative exposes Caribbean medical students to various fields within the scope of PALM through a series of didactic lectures.

Since August 2020, monthly sessions of 1.5 hrs duration have been held on every second Thursday throughout the university's academic year where medical students at the three campuses of the UWI (St. Augustine, Trinidad and Tobago, Mona, Jamaica and Cave Hill, Barbados) are exposed to career pathway talks by practitioners who are drawn from all the subspecialty disciplines that constitute PALM. Nine sessions were held for the 2020-2021 academic year and consisted of presentations delivered by an admixture of local, regional and international speakers who are experts in the various subspecialties of pathology.

The initiative has been very successful, with 66.7% of the sessions having more than thirty attendees. The St. Augustine campus has the highest attendance rate of more than 15 students for 77.8% of the sessions. Students have indicated that the content of the sessions is relevant to their degree and were able to comment on how the session increased their knowledge of the featured subspecialty of PALM.

Caribbean medical students have an interest in pathology and laboratory medicine; however, due to the limited exposure to pathology and laboratory medicine in the medical curriculum, many students are unaware of its scope. This initiative serves to educate medical students on the role of pathology and laboratory medicine in the delivery of healthcare, expose them to the various subspecialty disciplines and stimulate their interest in these subspecialties in an attempt to increase recruitment for postgraduate training and the numbers of specialists in the region.

### **2.3 Manner of Death Trends in Texas, Before and During the COVID-19 Pandemic**

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The COVID-19 pandemic resulted in extreme changes in the personal and professional lives of individuals throughout the world. Financial stress, the loss of personal freedoms, and regular human contact on top of the grief associated with deaths of friends and family members was devastating, resulting in an increase in mental health concerns. Because of this, it has been speculated and reported that the numbers of suicides, homicides, and drug related deaths have increased. In an effort to better define the effects of the COVID-19 pandemic on medical examiner/coroner (ME/C) caseloads, all deaths reported to the Montgomery County Forensic Services Department (MCFSD) in Conroe, Texas were examined for the three years leading up to the pandemic (2017-2019) and for 2020. Additionally, the annual reports for other major medical examiner's offices in Texas will be reviewed and analyzed for the same time periods. Montgomery County, Texas has seen a significant growth in population in recent years. Additionally, a hospital corridor that includes level I trauma centers and a children's hospital became fully operational in 2017. Because of this, the caseload handled by the MCFSD increased by 37% from 2017 to 2019. In 2020, the increase jumped to 68.5% since 2017, with a 23% increase in the total number of cases from 2019 to 2020. While the overall numbers of homicides, suicides and accidental deaths increased during the pandemic, the percentage of these cases has remained the same. When the lockdown was instituted in March 2020, we did see a sharp rise in suicides (200%) compared to February 2020. Following that spike, the number of suicides stayed relatively steady with the overall percentage falling in line with previous years. Motor vehicle related deaths typically comprise 30-33% of all accidental deaths; however, in 2020, that number declined to 25.7% due to the marked reduction in travel. The number of known domestic violence related incidents increased in 2020 along with the overall number of homicides, keeping the overall percentage stable from 2019 to 2020. Natural deaths now comprise 50% of the cases reported to the MCFSD and the overall number of deaths reported in 2020 increased by 29% from 2019.

The impact from the COVID-19 pandemic continues in 2021 as some areas are still locked down and others are opening up. Additionally, potential vaccine related deaths are being referred to and investigated by ME/C offices, further increasing caseloads in Texas and across the United States.

## 2.4 Frequency of Frontotemporal Lobar Degeneration (FTLD) in the Homeless Population

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Frontotemporal dementia (FTD) is a group of highly heritable neurodegenerative syndromes characterized by personality, language, and/or behavior disturbances. The underlying neuropathological features, collectively called frontotemporal lobar degeneration (FTLD), include circumscribed atrophy in the frontal and temporal lobes accompanied by protein inclusions in neurons. Examples of the neuropsychiatric manifestations of FTD include decreased personal hygiene, public urination, and lack of social boundaries. Patients do not have insight into their disease, and their progressive deterioration causes caregiver burnout, which leads to an increased risk of homelessness.

Due to the neuropsychiatric manifestations of FTD and the greater prevalence of mental illness in the homeless population, we hypothesized FTLD neuropathology to be present in a disproportionately large number of homeless subjects when compared to a general autopsy sample of individuals of the same age. Currently, no other literature exists on this subject.

Over the course of February 2020 to July 2021, 60 autopsy brains from subjects 55 years or older will be obtained from the Dallas County Medical Examiner's Office. Thirty of these brains will be from individuals with a history of homelessness, and the other thirty will be from control cases

without a history of homelessness. A complete FTLD histologic workup will be performed on all sixty autopsy brains; this process will allow for neuropathologic diagnosis of all currently known FTLD subtypes as well as other neurodegenerative disorders that may masquerade clinically as FTD. Following the results of the histologic workup, statistical analysis using chi-square will be performed.

Currently, we have collected and analyzed nine brains from deceased individuals with a history of homelessness. The histologic workup has resulted in no evidence of FTLD in these cases. Our current conclusion is that there is no increased prevalence of FTLD neuropathology in homeless subjects. However, our study is ongoing and we have only yet examined one-third of our anticipated population.

Although there exists a large quantity of research about FTD, this research project is the first of its kind. There are no other studies about FTLD and neurodegenerative disease in the homeless population. Our findings will provide valuable information for initiatives preventing homelessness and treating mental illness in this vulnerable population. Additionally, this study will provide insight into the demographics of neurodegenerative disease in the Dallas community.

## 2.5 Overdosed Death of a Young Female with Multiple Rare Syndromic Features Mayer-Rokitansky-Küster-Hauser Syndrome And Features Of Goldenhar Syndrome. A Case Report and Literature Review

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In this case report, the authors describe a 25-year-old female with multiple syndromic features who died of fentanyl intoxication. The decedent had features compatible with both Mayer-Rokitansky-Küster-Hauser Syndrome and Goldenhar Syndrome. In this article, the authors discuss the autopsy findings that were found in relation to the above syndromes along with a literature review.

Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome is a rare disorder that is characterized by the failure of the uterus and the vagina to develop properly in the embryo. In most cases, there is normal development of the breasts, external genitalia, and ovaries; however, there is ovarian function, normal breast development, and normal external genitalia. There are two types, which are described as type A and B and the decedent in this case report had features of type B, which is described in the case report in detail.

Goldenhar Syndrome, also known as oculo-auriculo-vertebral spectrum (OAV), is a rare congenital condition characterized by abnormal development of the eye, ear and spine that is seen in every 3,000-5,000 births. Children suffering from this syndrome are born with partially formed or totally absent ears, benign growths of the eye, and spinal deformities (for example, scoliosis). There may also be abnormalities of other facial structures and other body organs, such as the heart, kidneys, lungs, and nervous system.

The decedent had some of the facial features, spinal deformities, anomalies in the heart including an aneurysm of the membranous interventricular septum and a pelvic kidney, which will be discussed in detail in the case report.

## 3.1 The Impact of Donor Preparation for Organ/Tissue Harvesting on Postmortem Vitreous Isopropanol

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Volatile chemicals can be relevant in the determination of the cause and manner of death by forensic pathologists. Isopropanol can be seen in vitreous humor at autopsy and in addition to antemortem ingestion, its presence can be due to endogenous creation or postmortem contamination. We have previously reported 11 forensic autopsy cases in which isopropanol was identified in the vitreous humor and hypothesize that the presence was due to the body preparation process for tissue harvesting.

We present the preliminary results of our study performed with Gift of Life Michigan (GOLM). In collaboration with GOLM, previously research-consented body donors were used to collect vitreous humor from one eye prior to body preparation for harvesting and then from the other eye after completion. The specimens were sent to Spectrum Health Laboratory where specimens were tested for methanol, ethanol, isopropanol, and acetone by headspace gas chromatography. This study was determined to be "not regulated" after Institutional Review Board (IRB) submission.

The results of the volatile testing for a total of 33 cases with vitreous collected from each eye pre- and post-preparation were compared. In total, 10 cases showed changes in the pre- and post-preparation isopropanol concentrations ranging from 1.2 to 104.8 mg/dL (median: 4.65 mg/dL). The first 18 cases had a stockinette placed on the decedent's head during preparation, whereas the remaining 15 cases had no stockinette. Of the 18 cases with the stockinette, three cases had changes in the pre- and post-preparation isopropanol concentrations ranging from 1.7 to 20.4 mg/dL (median: 2.0 mg/dL). Of the 15 cases where there was no stockinette, seven cases had changes in the pre- and post-preparation isopropanol concentrations ranging from 1.2 to 104.8 mg/dL (median: 6.1 mg/dL). The presence of methanol and ethanol were not affected by body preparation as neither volatile was present in any sample pre- or post-preparation. As an internal control, acetone was present in 9 cases, and there was minimal change between the pre and post-preparation samples, ranging from 0 to 0.3 mg/dL (median: 0.111 mg/dl).

We conclude that surface contamination of the skin and mucous membranes by chemicals used in body preparation can lead to the passive absorption into the body resulting in the presence of isopropanol in postmortem toxicology samples. This is an important finding for forensic pathologists to be aware of when interpreting postmortem samples.

### **3.2 Forensic and Investigative Scene Factors Associated with the Undetermined Manner of Death**

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Undetermined deaths in the United States are on the rise and correlated to misclassified suicides, accidental deaths, overlooked findings, and inaccurate outcomes within the criminal justice system. The undetermined category has not been separately assessed within the different types of medicolegal investigative agencies. The research examined the forensic and investigative death scene field factors, in addition to the victim circumstances associated with the undetermined manner of death, through the lived experiences and insights of death investigators. The two research questions were created to help understand the undetermined manner of death phenomenon. What are the perceptions of study respondents regarding how examining the forensic investigative death scene field factors help reduce the undetermined manner of death findings? What are the perceptions of study respondents regarding how examining the forensic investigative death scene victim circumstances help reduce the undetermined manner of death findings? A qualitative case study was

conducted by triangulating data with professional interviews, short answer surveys, and secondary data review. Coroner and medical examiner officials who certified death certificates and oversaw death investigations were interviewed. Death investigators submitted short answer survey feedback. Secondary data within the National Violent Death Reporting System (NVDRS) was also used. Thematic analysis identified patterns related to answer the research questions. Secondary data findings identified an increased rate of substance abuse and mental health problems, alcohol dependence, physical problems, and recent crisis as indicators for the undetermined manner. The investigation, scene, victim, and investigator all served as unique variables for understanding the patterns related to corroborate and exclude evidentiary information for the manner of death determination. Participant findings included the following: internal and external case resources can inhibit or help investigators reduce undetermined cases; medicolegal investigator training and certification standards were reported as inconsistent and the lack of scene response hindered a comprehensive investigation; infant deaths, drug overdose, and decomposed cases were susceptible to a greater risk of undetermined findings; both detailed and accurate death scene field factors and victim circumstances are necessary to reduce ambiguous manner of death findings; and gaps and problems still exist related to an undetermined manner of death. Further research into all sizes, designs, and jurisdictions for undetermined outcomes to better understand gaps, complexities, applications, and knowledge from those practices, was recommended.

### **3.3 The Value of the Defence Postmortem Examination in England and Wales**

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In England and Wales, a defence or second postmortem examination is undertaken on the instruction by the defence legal team following the initial examination by a Home Office Registered Pathologist. Each defence team will request a "second examination" by a different pathologist on behalf of its defendant. When multiple defendants exist in a matter, multiple "second pathologists" will be instructed.

The second postmortem examination is essentially to audit the findings, interpretations, and conclusions of the forensic pathologist who had performed first examination to ensure that the first examination had been performed to the required standard as set out in the UK Code of Practice. This entails full and transparent disclosure of the findings of the first postmortem examination to the second forensic pathologist who has been instructed by the defence/other interested parties

Despite no statutory authority or legal precedent for the accused person to benefit from a postmortem examination, case law has made the practice inevitable and the culture has persisted. A defence postmortem examination will be requested by the defence legal team and performed by a second pathologist on their instruction as a routine practice. The obscure origin of this practice has allowed it to persist as a matter of routine in England and Wales, in stark contrast to international jurisdictions where a second invasive postmortem examination only occurs as a rare event.

The 2019 Chief Coroner's Guidance described a change in perspective from the 1999 Home Office Circular 30 in which a presumed right to request a second postmortem examination was replaced by a process of heavy scrutiny, favouring a paper-based desktop review of the evidence. The reasons for supporting this seismic change in practice are numerous, from the limited evidential value attained to undue distress experienced by the decedent's family. Whilst it remains imperative for accused persons to examine and test the evidence, this can often be objectively and robustly enacted without a second invasive examination. Any paradigm shift takes

time, and may be met with resistance, particularly when the culture is established at all levels of the legal system in which it exists.

This presentation will discuss the evidential and overall value of this routine practice and why a shift in practice is necessary in order to best serve the interests of the defendant, decedent, and relatives.

### 3.4 Let's Talk about Drugs: Excipient Lung Disease and Interpretation of Postmortem Findings

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Intravenous injection of crushed oral tablets is a clinically underrecognized route of prescription opioid abuse. Due to the presence of inactive fillers (or "excipients") in oral tablets, this method of prescription drug abuse produces histopathologic findings characteristic of intravascular pulmonary talcosis, or "excipient lung disease" (ELD). The location, birefringence, size, and shape of excipient material, as well as the surrounding tissue response, provides valuable information about the decedent's drug use history. In rare cases, ELD may even play an immediate or contributing role in the cause of death. We present two autopsy cases of ELD in which the decedents had opioid prescriptions for chronic medical conditions, and there was no clinical suspicion of intravenous drug abuse.

In the first case, a 50-year-old female nurse specializing in pain management for the terminally ill was found dead at home with a peripheral venous catheter in her wrist, attached to an unfiltered syringe containing red fluid and red granular material. Toxicological analysis of the fluid revealed morphine and oxycodone, which were prescribed to the decedent in oral formulations for chronic pain. Microscopic examination of the lungs showed large (50-200  $\mu\text{m}$ ) particles of blue-gray, birefringent foreign material obstructing the small arteries and associated with foreign body giant cell reaction, consistent with cellulose pulmonary embolization. Cardiomegaly with biventricular hypertrophy and congestive hepatopathy was also noted at autopsy which, in the setting of excipient lung disease and a clinical history of hypertension, may indicate previously undiagnosed pulmonary hypertension.

In the second case, a 35-year-old hospitalized female with sickle cell anemia was found unresponsive in bed shortly after an uncomplicated bile duct stent removal. A review of the electronic medical record showed that the decedent repeatedly requested intravenous line placement during hospitalization and that a central venous catheter had been placed the day prior to surgery. Microscopic examination of the lungs revealed innumerable cellulose emboli and multiple large (>50  $\mu\text{m}$ ), nonpolarizable, amorphous, dark-purple emboli consistent with crospovidone (a water-insoluble additive that expands upon contact with water). While most excipient emboli were associated with giant cells, some small arteries contained intraluminal cellulose lacking giant cell reaction or fibrosis, suggesting the possibility of acute perimortem embolization.

These cases illustrate the histopathological features of excipient lung disease, a condition rarely diagnosed antemortem, which nevertheless may significantly contribute to the cause of death even in the absence of an acute toxicologic overdose.

### 3.5 The Postmortem Interpretation of Cardiac Genetic Variants of Unknown Significance in Sudden Death in the Young: A Case Report

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Sudden cardiac death (SCD) in adolescents and young adults is a major traumatic event for families and communities. In these cases, it is not uncommon to have a negative autopsy with structurally and histologically normal heart. Such SCD cases are generally attributed to channelopathies, which include long QT syndrome, short QT syndrome, Brugada syndrome, and catecholaminergic polymorphic ventricular tachycardia. Our understanding of the causes for SCDs has changed significantly with the advancements in molecular and genetic studies, where many mutations are now known to be associated with certain channelopathies. Postmortem analysis provides great value in informing decision-making with regard to screening tests and prophylactic measures that should be taken to prevent sudden death in first degree relatives of the decedent. As this is a rapidly advancing field, our ability to identify genetic mutations has surpassed our ability to interpret them. This led to a unique challenge in genetic testing called variants of unknown significance (VUS). Variants of unknown significance present a diagnostic dilemma and uncertainty for clinicians and patients with regard to next steps. Caution should be exercised when interpreting VUS since misinterpretation can result in mismanagement of patients and their families. A case of a young adult man with drowning as his proximate cause of death is presented in circumstances where cardiac genetic testing was indicated and undertaken. Eight VUS in genes implicated in inheritable cardiac dysfunction were identified and the interpretation of VUS in this scenario is discussed.

### 3.6 Complex and Complicated Suicide: An Analysis of Suicide Cases From One Academic Institution and a Literature Review

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Introduction: Suicide is a manner of death which results from an intentional or self-inflicted act to cause self-harm or death. Suicides can be further classified based on the number of modalities used. Simple suicide is defined as one method used to cause death. Complex suicide is defined as two or more methods used. These can be further divided into planned (multiple methods are used simultaneously) or unplanned (the initial method fails and others are subsequently used). Complicated suicide is defined as when the failure of the intended method leads to an accidental or unintentional fatal outcome. Complex and complicated suicides are rare, making up only 1.5-5% of suicide cases, but can make cause and manner of death determination difficult and thus deserve recognition.

Methods: Autopsies from 2014 through 2020 were examined. We looked at cases with suicide certified as the manner of death, and further characterized them into three definitions: simple, complex, and complicated. Additional characteristics investigated were age, sex, history of depression, past attempts, alcohol use, and presence of a suicide note. These were compared between the three definitions. We then compared our results to previously published reports.

Results: Our analysis revealed 357 suicides. 338 were simple (94.6%), 17 complex (4.8%), and 2 complicated (0.6%). For complex and complicated suicides, ages ranged from 25 to 77 and 58% were male. Three methods were used at most. The most common planned complex suicides were asphyxia with a plastic bag combined with gas inhalation (n=5), followed by the use of carbon monoxide with diphenhydramine (n=3). Other common example methods for both planned and unplanned complex suicides included deep cutting or hanging. 47% had a history of depression, 21% had known prior suicide attempts, 63% left a suicide note, and 32% had nonlethal amounts of ethanol on toxicology.

Discussion/Conclusions: The use of multiple modalities for suicide deaths are rare but can present difficulty in determining cause and manner of death. Our analysis of the prevalence of complex and complicated suicides was consistent with previously reported data. We additionally looked at age,

sex, history of depression, past attempts, alcohol use, and presence of a suicide note to better characterize these cases.

### 3.7 Autoerotic Death by Electrocutation: An Atypical Case Study

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Autoerotic deaths are relatively uncommon, accounting for between 500-1000 deaths per year in the United States. Autoerotic death can be defined as an accidental death that occurs when some type of apparatus is used to enhance sexual stimulation of the deceased and causes an unintended death. The majority of these are due to asphyxiation by hanging, ligature, or chemical means and are deemed "typical" autoerotic deaths. "Atypical" autoerotic deaths account for a much smaller proportion, reported at 10.3% in the available published literature. Published reports of atypical autoerotic deaths have included electrocution, overdressing or body wrapping leading to hyperthermia or smothering, foreign body insertion with traumatic injury, atypical asphyxiation methods including positional asphyxiation and miscellaneous causes. We present the case of a 23-year-old male found deceased in the bathroom of his locked dormitory clad only in an elastic bandage wrapped around his waist and genitals with pornographic materials nearby. An electrical cord with a standard wall plug on one end and exposed wires twisted into loops on the other was on the floor near his body. At autopsy minute black burns were found on each nipple. The only outlet near the decedent was the bathroom outlet which was protected by a ground fault circuit interrupter (GFCI). The GFCI protecting the circuit was demonstrated to be in working order and had not been tripped prior to testing at scene investigation. Because the GFCI was shown to be working properly, a local electrical consultant concluded that the cause of death in the case could not be electrocution. A GFCI works by detecting a difference in the current between the two sides of the circuit. If a ground fault occurs the difference causes an automatic shut off to prevent a fatal electrocution. In this case, the GFCI did not shut off because the decedent had literally wired himself as the "appliance" in the circuit: with one electrical lead touching each nipple, current flowed through his chest and resulted in a low voltage electrocution as the cause of death. This, in combination with the other findings at the scene, indicated this to be a case of atypical autoerotic death. Given that autoerotic deaths by means other than asphyxiation are rare, they may not be readily identified as such. This case serves to illustrate the circumstances of an atypical autoerotic death by means of electrocution.

### 3.8 Placental Pathology in Mothers Positive and Negative for SARS-CoV-2

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Introduction: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the betacoronavirus responsible for the 2019 pandemic that has resulted in over 3 million deaths worldwide thus far. Although it is known the infection may result in a hyperinflammatory host response, the effect of maternal infection on pregnancy outcomes is poorly understood. Many maternal viral infections may directly or indirectly injure the fetus via the placenta, including organisms such as cytomegalovirus (CMV), Zika, and SARS-1. Because other viral infections may result in fetal demise, forensic pathologists may be asked to evaluate the placenta to determine if SARS-CoV-2 is responsible for or contributed to fetal death in cases of maternal positivity during pregnancy. The following study compares placental pathology findings in mothers positive and negative for SARS-CoV-2.

Methods: A natural language search identified all placentas submitted to the surgical pathology service at the Medical University of South Carolina with "COVID" listed within the clinical history between March and October 2020. It was verified the mother was positive for the virus by PCR testing. Serologic testing in positive cases was also identified. For a negative control, placentas from mothers negative for the virus were matched to the maternal age, term, and clinical history of the positive mothers. Histologic diagnoses were then collated into categories of maternal vascular malperfusion (MVM), fetal vascular malperfusion (FVM), acute inflammatory (AI), chronic inflammatory (CI), and miscellaneous, and compared.

Results: Fifty placentas from COVID positive (n = 25) and negative (n = 25) mothers were identified. 84% of positive cases had a positive PCR result within 7 days of delivery. All positive mothers were asymptomatic at delivery excluding one patient presenting with fever, rigors, and postpartum coagulopathy. There were no cases of intrauterine or postpartum fetal death. Serology was performed in 96% of cases, 50% of which were positive for IgG antibodies. Comparing positive and negative cases, no differences were identified in the categories of MVM (p = 0.171), FVM (p = 1), AI (p = 0.364), and CI (p = 1). Pathologic findings were also compared in cases with positive and negative serology, which likewise showed no differences.

Conclusion: No significant difference in placental pathology was identified in COVID positive and negative cases. Although much is still unknown regarding the effects of infection on pregnancy, it appears placental pathology may only rarely explain fetal demise in the setting of asymptomatic/mildly symptomatic maternal SARS-CoV-2 infection.

### 3.9 Suicide by Gaseous Displacement of Atmospheric Oxygen with Carbon Dioxide from Dry Ice Sublimation

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Deaths from gaseous substances can occur from exposure to toxic gases or from accumulation of nontoxic gases that displace atmospheric oxygen. Gaseous suffocation is most frequently accidental, often in occupational deaths involving silos, sewers, tunnels, and mines. Less commonly, suicides involving gaseous asphyxia have also been reported.

We present a 38-year-old man with no known medical history, who was found deceased in his residence. He was located in a small bathroom, lying on the floor on bedding and a pillow. Multiple suicide notes addressed to family members were recovered from the residence. The decedent had barricaded himself in the room with blankets and towels shoved under the door from the inside. There were several inches of water in the bathtub, with an empty plastic laundry basket floating within.

At autopsy, the decedent was found to be in a moderate state of decomposition, with gas expansion, marbling, and skin slippage. There was mild pulmonary congestion, with no other significant findings noted grossly or on microscopic evaluation. The decedent's heart was of normal weight, with mild coronary artery atherosclerosis, no myocardial scars, mottling, hypertrophy or dilation. Heart valves were unremarkable, and pulmonary thromboemboli were not identified. A nasopharyngeal swab for COVID-19 was negative. Standard toxicology testing on femoral blood was non-contributory, showing only ethanol (49 mg/dL), doxylamine (140ng/mL) and caffeine.

Search of the decedent's cell phone revealed statements and internet searches regarding carbon dioxide (CO<sub>2</sub>) and asphyxia using dry ice. A journal entry also outlined a suicide attempt plan using large amounts of dry ice.

Dry ice undergoes sublimation to a gaseous state, which is heavier than oxygen, and that easily settles in dependent areas in the absence of turbulence. Carbon dioxide can accumulate rapidly, especially when dry ice is warmed quickly, with concentrations of 10% or more, rapidly precipitating unconsciousness and death. The decedent's location (on the floor), and the water in the bathtub (possibly used to accelerate dry ice sublimation), corroborate the cause of death, determined to be due to asphyxia from displacement of oxygen with CO<sub>2</sub>. The manner of death was classified as suicide. Given that CO<sub>2</sub> levels naturally accumulate after death, there are no pathognomonic autopsy findings seen in CO<sub>2</sub>-related asphyxia. In these circumstances, scene investigation is the most important factor in determining cause of death. We hope that with this case we can highlight an unconventional method of suicide and the necessity of thorough scene investigation.

### 3.10 A Case of Type 1 Citrullinemia Presenting as Sudden Death in Infancy

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Type I citrullinemia is an autosomal recessive disorder of the urea cycle that results in a loss of the enzyme argininosuccinate synthetase that converts citrulline into argininosuccinate. As a result, the increased amount of citrulline is converted into ammonia, causing toxic effects. As ammonia levels rise, lethargy and eventual coma ensue. Herein, we present a case of a 3-day-old male infant who was discharged home from the hospital on day two of life, following a normal spontaneous vaginal delivery. He began to have difficulty breathing and when nursing was attempted, he had difficulty feeding and eventually became lethargic. He was brought to the emergency department of a local hospital where he was found to be in full arrest; life saving intervention was attempted but unsuccessful. At autopsy examination, there was a slight yellow discoloration of the skin and no external trauma. Internally, there was hepatomegaly, a mildly dilated right ventricle, and moderate cerebral edema. Microscopic examination showed diffuse microvesicular steatosis of the liver and apparent Alzheimer type II astrocytes in the brain. The newborn screen was requested from the state department of public health as it had not been resulted at the time of death. The newborn screen showed a markedly elevated citrulline level at 920.87 mmol/L. Other amino acids of the of the urea cycle were within normal limits. Given the marked elevation in citrulline, in the absence of other metabolic abnormalities, the presentation of the infant, and the microscopic changes in the brain suggestive of hepatic encephalopathy, a final diagnosis of Type I Citrullinemia was made. Investigation into how this case was missed by the newborn screen revealed that this metabolic disorder may have a window period before presentation. The condition manifests itself in the first few days of life and infants generally appear normal at birth. Fortunately, in most cases infants will begin to display symptoms prior to discharge from the hospital and ammonia levels can be obtained. It is important for forensic pathologists who certify pediatric deaths to be aware of this metabolic disorder as it may result in death prior to completion of the newborn screen.

### 3.11 Two Cases of Fatal Thrombotic Complications Following Ad26.COV2.S Vaccine

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On February 27, 2021, the Food and Drug Administration (FDA) issued an emergency use authorization of the Johnson & Johnson/Janssen Ad26.COV2.S adenoviral vector vaccine for people 18 years of age and older. Less than two months later, on April 13, 2021, the Centers of Disease Control and Prevention (CDC) and the FDA recommended a pause in the use of the Janssen COVID-19 vaccine following several reports of thrombosis with thrombocytopenia syndrome (TTS) after vaccination. In

particular, incidents of cerebral venous sinus thrombosis (CVST) with thrombocytopenia, a rare thromboembolic syndrome, were documented in six cases out of seven million vaccine recipients. While the precise mechanism of TTS in relation to the COVID-19 vaccination has not yet been established, the clinical course and laboratory testing suggest that the pathogenesis of TTS may be similar to autoimmune heparin-induced thrombocytopenia. We report two cases of fatal CVST in the setting of recent Janssen COVID-19 vaccination. Both patients were female, 35 and 60 years of age. They both complained of fatigue, nausea and constant headaches a few days after receiving the vaccine. One of the patients was hospitalized with severe thrombocytopenia and a computed tomography scan of the head demonstrated subarachnoid hemorrhage, increased intracranial pressure, and questionable cerebral venous sinus thrombosis. The second patient was found dead at home. Postmortem (autopsy) and neuropathologic examinations in both decedents were remarkable for dural venous sinus thrombi; specifically, one case involved the superior sagittal sinus and the other, the transverse sinus. Additional neuropathologic findings included subarachnoid and intraparenchymal hemorrhages as well as diffuse cerebral edema and herniation. Based on the clinical progression of symptoms in relation to the time of vaccination, as well as the absence of any other identifiable disease processes at autopsy to offer a reasonable competing pathophysiologic sequence of events, the cause of death in both cases was certified as complications of dural venous sinus thrombosis following the administration of the Janssen COVID-19 vaccine. These cases carry important clinical and public health implications. The data gathered from autopsies on individuals with these rare complications can provide information regarding the pathophysiology of vaccine related TTS and CVST. In addition, the data can be utilized in future studies to evaluate the safety of the Janssen vaccine, determine which patient populations are more suitable to receive it, educate the public about potential side effects, and most importantly, monitor and treat rare potential thrombotic complications.

### 3.12 Aerial Lift-Related Deaths: A Forensic Pathology Perspective

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From 2015 to 2019, the US Bureau of Labor Statistics reported that fatal work-related injuries have steadily increased, most recently accounting for more than 5,300 deaths per year. While the majority of these deaths are transportation related, a smaller subset of deaths involve aerial lifts, which include deaths when an individual is on a cherry picker, bucket truck, or elevating platform. Deaths commonly occur when an individual is on a construction site, but can occur in other settings, including a private residence. A review of the authors' aerial lift-related deaths revealed six deaths that occurred while an individual was in a bucket of an aerial lift. Four deaths were due to electrocution and two deaths were due to blunt force injuries. An in-depth look at the circumstances of death, scene of the accident, autopsy findings, and review of recommendations to minimize aerial lift-related deaths, including the "Construction Focus Four" identified by the Occupational Safety & Health Administration from a forensic pathology perspective is presented.

### 3.13 Hybrid Capture Panel Targeting Coding and Non-coding Regions Associated with Sudden Cardiac Death Enables Faster Diagnosis of Sudden Unexplained Death in the Young

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Every year, thousands of cases of sudden and unexpected deaths (SUD) of infants, children, and young adults are assigned an undetermined cause of death after postmortem investigation and autopsy. Recent studies have shown that exome sequencing may help explain the cause of up to a third of these sudden unexplained deaths. Noncoding pathogenic variation, structural genetic variation, and somatic mosaicism may play a role in exome-negative SUD.

In this light, we developed and explored the potential of a hybridization-based capture panel of targeting both coding and noncoding regions associated with 299 genes involved in SUD. This capture panel is coupled with whole transcriptome sequencing from postmortem heart tissue from prior exome-sequenced cases of the Scripps Molecular Autopsy study. With a focus on the noncoding regulatory regions, we re-examined 56 sudden unexplained death in the young (SUDY) cases with no prior history of cardiac diseases. We identified 3 candidate variants in regulatory and coding sequences of cardiac genes, including a variant in the coding region of NEBL, c.361\_368delAAATACCA, not detected previously on whole-exome sequencing, that was found to be associated with dilated cardiomyopathy. As analysis continues, we provide the first insight into a more comprehensive genomic strategy for the identification of genetic lesions contributing to exome-negative SUD.

### 4.1 An Unusual and Fatal Branchial Cyst Case

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**Introduction:** A branchial cyst, also called branchial cleft cyst, is a benign lesion caused by an abnormal congenital development of the pharyngeal arches during the embryonic period. This results from a failure of the obliteration of one the arches and constitutes a frequently encountered and commonly non-lethal disease. The lesion usually presents at birth as a unilateral neck cystic cavity in the neck and can vary significantly in size. The cyst may not be recognized at birth due to its small size, and maybe become evident days or weeks after birth or even during adolescence, as it increases in size.

**Case presentation:** We present the case of an 8-day-old female who was admitted to the emergency room with neck swelling, difficulty breathing, and cyanosis. In spite of resuscitative efforts, she was pronounced dead shortly after admission. Postmortem external examination showed a large cyst encompassing the entire anterior left side of the neck displacing the midline to the opposite side. There were no other external injuries identified on the neck. The internal examination revealed a large tension cyst on the entire left side of the neck measuring 6 x 4 x 4 cm. The cyst compressed the larynx, trachea, and left bronchus, with the contents consisting of sticky yellow fluid. The cyst wall lining was gray. There was a fistula between the cyst wall and left side of the larynx at vocal fold level. Cyst histology revealed squamoid contents including squamous cells and columnar cell lining with underlying ectopic thymus tissue and fibrosis.

**Discussion/Conclusions:** The internal examination of the neck tissue combined with the histology was consistent with a diagnosis of a large branchial cyst compressing adjacent structures including the larynx, trachea, and left bronchus, with fistula formation between the cyst and larynx that resulted in aspiration of branchial cyst contents. Branchial cysts commonly have an uncomplicated clinical course; however, they can rarely lead to death. When not recognized or misdiagnosed, they can lead to inappropriate treatment with subsequent infection and rupture, or as in our case, they can become large enough to compress airway passages. Medical examiners must be aware that branchial cysts, despite having a usually uncomplicated clinical course, can be fatal in some cases, and should be recognized as a cause of death.

### 4.2 Neuropathology and Molecular Mechanisms in Sudden Unexplained Death in Childhood (SUDC)

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**Introduction:** Sudden unexplained death in childhood (SUDC) is the death of a child over one year of age that is unexplained despite review of clinical history, circumstances of death, and complete autopsy with ancillary testing. SUDC is thought to result from multiple etiologies; thus, detailed investigation is required to identify the potential cause(s) of death (COD). Hippocampal findings are implicated in the pathogenesis of SUDC, although some studies have identified similar findings in explained COD cases. Additional studies are needed to understand the pathogenesis resulting in SUDC so that risk can be reduced.

**Methods:** We performed a blinded neuropathology review and localized molecular analyses. For the blinded review, hippocampal H&E stained slides (n=67; 36 SUDC, 31 controls) from clinical and forensic collaborators were evaluated by nine reviewers from three training backgrounds: three board-certified forensic pathologists, three neuropathologists, and three dual-certified neuropathologist/forensic pathologists. For molecular analyses of brain tissue, we performed localized proteomics on microdissected hippocampus and frontal cortex of 19 SUDC and 19 controls.

**Results:** From the blinded review, just over 50% of hippocampal sections were rated as abnormal (SUDC 52.5%, controls 53.0%), with no difference by COD group (p=0.16) or febrile seizure history (p=0.90). Further, there was little agreement among the nine reviewers on whether a hippocampal slide was within normal range (Fleiss' kappa=0.014, p=0.47). Within the three reviewer groups, there were no findings more frequent in SUDC compared to controls, with variability in pyramidal neuron and dentate gyrus findings. Across reviewer groups, there was concordance for bilamination and granule cell loss. Neither SUDC (51.2%) nor control (55.9%) slides were considered contributory to determining COD (p=0.41). Localized proteomic analyses identified differences in SUDC frontal cortex (increased oxidative phosphorylation, decreased translation) and hippocampus (increased acute phase response) compared to controls.

**Conclusion:** The lack of an association of hippocampal findings in SUDC and controls, as well as inconsistency of observations by multiple blinded reviewers, indicates a need for larger studies to standardize the evaluation of hippocampal findings, identifying the range of normal variation and

pathology, or phenomena unrelated to SUDC or febrile seizures. Molecular studies may help identify robust novel markers that inform on COD.

#### 4.4 COVID-19-Associated Youth Suicides in Clark County, Nevada, So What?

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Data show that in the United States, suicide is the 10<sup>th</sup> leading cause of death among all age groups and the 2<sup>nd</sup> leading cause of death among the 10-19 year old age group. Increased suicide rates have been associated with previous pandemics and have been seen during the COVID-19 pandemic. Multiple factors such as isolation, loneliness, and psychological disorders may possibly contribute to the increase.

In response to the COVID-19 pandemic, Nevada Governor Steve Sisolak announced that all schools would close on March 16, 2020. By year end, 17 Clark County, Nevada school students, ages 8 to 17 years, died by suicide, representing a 55% increase compared to 2019. This alarming statistic prompted The Clark County School District, the 5<sup>th</sup> largest in the nation, to begin bringing students back into the classroom as quickly as possible.

Medical examiner and coroner (ME/C) offices have an important public health role. Medicolegal death investigators work closely with families in the aftermath of a suicide death. During the investigation of a suicide of a school-aged child, in addition to information regarding medical history, psychiatric history, and suicide ideations/previous attempts, academic and social history should be obtained and recorded. The answers provided may serve as a road map to trace how children arrive at a suicide event and in turn possibly prevent a death by suicide.

A comprehensive review of each suicide death during 2015 to 2020 of a youth between 8 and 17 years old was completed by multidisciplinary team members of Clark County Child Death Review (CDR). In-depth evaluation of each case revealed crucial elements that would allow the participating agencies, including Nevada Suicide Prevention Office, to work on targeted prevention initiatives aimed at reducing the number of youth suicides. Partnering with gun shops to promote firearm training to the creation of Project Aware for increased access to mental health support in school are examples of innovative prevention strategies being implemented.

Bringing children back into schools was only an initial step to addressing the recent spiraling youth suicide trend in Clark County. The Clark County Office of the Coroner /Medical Examiner is committed to the development and implementation of prevention strategies through evaluation of data and continued discussions, as an integral member of Clark County CDR, and aims to serve as an example to encourage other ME/C offices around the country to do the same.

#### 4.5 Perforations of the Heart during Elective Removal of an Inferior Vena Cava Filter: A Case Report

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Introduction: A common treatment of venous thromboembolic disease in patients with contraindications to pharmacologic anticoagulation includes the placement of an inferior vena cava (IVC) filter. The filter is meant to disrupt the travel of a large pulmonary thromboembolism to the heart from the deep veins of the pelvis and lower extremities. Temporary filters are available to avoid the risks of long-term, permanent placement. Prompt

removal of the filter as soon as clinically acceptable is recommended to decrease risk of complication from filter retrieval.

Case Report: A White woman aged in her 60's with a history of uterine serous carcinoma presented to the emergency department in cardiac arrest following an elective attempted IVC filter removal. She had a history of deep vein thrombosis and was previously on anticoagulation therapy, which had been stopped prior to planned hysterectomy. The hysterectomy was uneventful and prior to filter removal, her pre-operative assessment was normal and her cancer was in remission. At the time of the IVC retrieval procedure by an intravascular approach from the right jugular vein, the filter was found to be tilted which required the use of a different retrieval sheath. During catheter re-entry, the patient complained of discomfort in the chest and neck, after which she became hypotensive and lost consciousness. Cardiopulmonary resuscitation measures were started and she was transferred to the emergency department with weak pulses. She was pronounced dead shortly after arrival.

Results: At autopsy, there were two cardiac perforations: one in each ventricle. These corresponded to one track from the right atrium through the tricuspid aperture to the right ventricle and then exiting the posterior apical wall of the right ventricle. The second track went from the right atrium to the right ventricle, perforated the inferior intraventricular septum, entered the left ventricle, and then exited at the posterior wall of the left ventricle. Approximately 600 milliliters of liquid and clotted blood were identified within the tense pericardial cavity. The IVC filter was found in place with no adjacent hemorrhage.

Discussion: To date, this is the first described fatality due to cardiac perforations during intravascular removal of an IVC filter. Placement of a filter is a standard therapy when anticoagulation therapy is contraindicated in patients with thromboembolic disease. Complications can occur during retrieval but the risk of fatality is relatively low. This case also documents the time course of the cardiac perforations to the resultant loss of consciousness.

#### 4.6 The Public Health Role of Medical Examiner's Offices during COVID-19 and Other Mass Fatality Events

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##### Background

Introduction: Medical examiner offices (MEO) are often involved in mass fatality responses involving natural or man-made catastrophes. The public health role of MEO in a pandemic is largely undefined, however, death data may be useful in strategic planning. In this situation as well.

Methods: Deaths reportable to MEO are defined in statute, with discretion as to assumption of jurisdiction. We analyzed the daily reported death numbers (DRDN) in our jurisdiction from March 1, 2020 to March 31, 2021 and compared them to hospital admission and COVID-19 fatality data over the same time period. Hospital admission data were analyzed in real-time and with a two-week timeshift, as deaths are considered to lag behind hospital admissions as a public health metric. Pearson correlation tests were used to determine correlations and statistical significance.

Results: Moderate correlation was observed between DRDN and hospital admissions ( $r=0.570$ ) and this improved to strong correlation ( $r=0.645$ ) when the two-week timeshift was incorporated into the analysis. Both evaluations were statistically significant ( $p<0.0001$ ). The DRDN also moderately correlated ( $r=0.412$ ) with the number of COVID-19 deaths at a similar level of statistical significance.

Conclusions: The number of deaths reported daily to our medical examiner office (DRDN) correlated with hospital admissions over the course the COVID-19 pandemic, particularly when a two-week lag was introduced to the analysis (a common public health practice), but also in real time. A weaker correlation between COVID-19 deaths and DRDN was also noted at statistical significance even though the majority of these deaths were not reportable by statute. Because death certification and hospital diagnosis may be delayed by days, real-time trend recognition in a pandemic may be delayed. The DRDN from a medical examiner/coroner office is a readily obtainable metric and may be useful as a surrogate metric in certain pandemic mass casualty decisions (alerts to deathcare stakeholders, expansion of body storage capacity, mobilization of additional resources, etc.)

#### 4.7 Autopsy-Diagnosed Injury Deaths in Persons with Acute or Chronic Alcohol Use: A review of 1000 Deaths with History of Alcohol Use

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Acute and chronic alcohol use are associated with injury, and autopsies may be performed to ascertain injury deaths in persons with acute or chronic alcohol use. This study sought to determine how many decedents with a history of acute or chronic alcohol use had an internal physical injury diagnosed only at autopsy that caused or contributed to the death. The study reviewed medicolegal investigation and autopsy reports at the New York City Office of Chief Medical Examiner between Jan 1 and October 11, 2018, to identify 1000 consecutive persons with suspected acute or chronic alcohol use who were autopsied to ascertain whether internal physical injury caused or contributed to the death. Of 1000 persons with known or suspected acute or chronic alcohol use, 388 (38.8%) had an external injury. While 115 (11.5%) had an internal injury at autopsy, only 29 (2.9%) had an injury that caused or contributed to the death. Only one person (0.1%) had an internal injury that caused the death with no associated external evidence of injury. This study demonstrates the rarity of occult lethal injury diagnosed at autopsy in persons with acute or chronic alcohol use.

#### 4.8 Sudden Death in Diabetic Ketoacidosis Complicated by Sickle Cell Trait

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In a sudden death investigation of a service member with sickle cell trait (SCT), evidence of sickle cell crisis further complicated by coexisting, undiagnosed diabetic ketoacidosis (DKA) called into question the synergistic effects of DKA on red blood cell (RBC) sickling. Sickle cell trait affects more than 4 million people in the United States (US) with the highest prevalence in non-Hispanic Blacks (7-9%). The heterozygous state of hemoglobin (HbS) was previously considered a benign condition causing sickling during hypoxic, high-stress conditions such as exercise and high altitude. However, research within the last decade shows evidence of sudden death among SCT patients. It has been shown that the presence of HbS artificially lowers levels of hemoglobin A1c (HbA1c) making it a less effective biomarker for RBC glycosylation over time in sickle cell patients. The limited scope of medical understanding of the effects of SCT in combination with other comorbidities requires further investigation and better diagnostic criteria. The uniqueness of the US Military and its screening program for sickle cell disease (SCD) and SCT allows for more detection, but the absence of such national screening makes it more

challenging to identify SCT and SCD patients even within high-risk populations. International standards for the autopsy of decedents with SCD and SCT exist. Testing of vitreous electrolytes is a common practice in suspected natural death cases based on circumstances, but a review of the US literature did not demonstrate any autopsy standards or recommendations for persons with SCT or high-risk persons for sickling pathologies. The identification of a new diagnosis of diabetes, as the cause of death, is not uncommon; however, this case indicates that diabetes was not the sole contributing factor. It further illustrates that the US may be underestimating the impact of SCD and SCT as a cause of death, a contributing factor to death, and its synergistic effects with other pathologic processes. We propose a stringent literature review in conjunction with a review of international autopsy standards to develop national autopsy standards and possible SCT/SCD screening recommendations for high-risk persons at the time of autopsy.

#### 4.9 SARS-Cov-2 (COVID-19) Survival in Embalmed Bodies

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Since the first reports regarding SARS-CoV-2 infections, numerous studies have been conducted using postmortem samples to determine the viral life cycle of SARS-CoV-2 in human hosts and identify the most susceptible tissues and organs. However, the risk of postmortem infection from SARS-CoV-2 positive embalmed bodies to medical, laboratory, funeral home, and crematory personnel is unknown. Moreover, medical schools are facing unprecedented challenges in accepting body donations, which are crucial for essential medical education and advances in medical science. Due to the unknown virulence in SARS-CoV-2 positive embalmed bodies, numerous donors have been rejected from medical schools in the recent period, adversely impacting the continuum of medical education.

Recent research found that SARS-CoV-2 RNA could be detected even up to 42 days after death. However, no definitive information is available in the literature regarding virus pathogenicity after embalming.

This study aims to evaluate SARS-CoV-2 persistence and virulence in postmortem samples to better understand the real infectious risk to key personnel who handle SARS-CoV-2 positive bodies for autopsy, teaching, research or funeral purposes. The study is being conducted on bodies donated to SUNY Upstate Anatomical Gift Program. For each body, samples from the lungs, liver, spleen, and brain will be collected before and after the embalming. The presence of the virus will be determined by real-time quantitative RT-PCR, and the full genome sequence of the viral isolate will be determined using a modified ARCTIC protocol with next generation sequencing. The viability and infectivity of the viral isolate will be determined using passage in human embryonic kidney cells (HEK-293T) expressing human ACE 2 receptor, with plaque assays at different dilutions from different embalmed and unembalmed samples.

This study will contribute to public health by understanding the actual pathogenicity of SARS-CoV-2 in embalmed bodies and evaluating the potential protective factor of the embalming process in inactivating the virus. We hypothesize that the embalming process will substantially reduce the presence and infectivity of SARS-CoV-2, allowing bodies from COVID-19 patients to be safely handled, minimizing the risk of potential infection. This will help medical schools to start accepting SARS-CoV-2 positive body donors to restart essential medical education worldwide.

The forensic community will also benefit from this study since it will give critical information about the actual infectious risk in bodies undergoing embalming procedures.

This is the first dedicated study to evaluate the SARS-CoV-2 survival in embalmed bodies. A thorough discussion of the results will be presented.

#### **4.10 An Outbreak of Legionnaires Disease at the Illinois Veterans' Home in Quincy, IL in 2015: Implications for Medicolegal Death Investigation and Public Health, and History Continually Repeats Itself**

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In August and September of 2015, the Illinois Veterans' Home in Quincy, IL suffered an outbreak of Legionnaires disease. Fourteen veterans living at the facility died. The first resident was a 79-year-old woman in an assisted-living cottage with significant cardiac disease who was found deceased in her residence in early stages of decomposition. The coroner was notified of the death and accepted jurisdiction as a medical review death investigation. The next day the Illinois Department of Public Health (IDPH), and the Centers for Disease Control (CDC) requested autopsies of now three deceased Veteran residents for suspected Legionnaires disease. The IDPH and CDC requested vials of lung and airway tissue, tracheal swabs, nasal pharyngeal swabs, and a vial of blood for their own testing. The autopsies showed degrees of ischemic heart disease and emphysema, and recent bronchopneumonia. There was concern regarding the infectious nature of *Legionella pneumophila* and autopsy transmissibility. A single forensic pathologist and autopsy assistant performed the autopsies. The next day there were four more deaths and autopsies showed severe bronchopneumonia, with underlying cardiopulmonary diseases. Again, samples were collected for the IDPH and CDC. Two days later another suspected Legionnaires disease death occurred. The lungs showed early organizing and ongoing bronchopneumonia, consistent with disease progression. Reportedly urine was positive for Legionella antigen several days before his death, consistent with the timing of the initial outbreak. The next autopsy was a week later, and the 92-year-old man had severe organizing pneumonia and diffuse alveolar damage with underlying ischemic heart disease. The final autopsy was six weeks later in a 66-year-old resident who showed older diffuse alveolar damage and overlying newer bronchopneumonia, and urine positive for Legionella antigen. In total there were ten autopsies, ages 66 to 94 years, all confirmed by the CDC as having Legionnaires disease pneumonia. At that point autopsies were no longer necessary, and medical reviews, blood, and urine tests were performed to confirm the diagnoses, with a total of 14 fatalities in 2015. Investigations, political fallout at state government, and litigation followed, all recently resolved. Families of the deceased received a legal settlement of \$12 million due to the delayed response to the outbreak. The causes of the Legionella outbreak were ineffective water system repairs within an aging facility. Unfortunately, history repeated itself in 2021 during the initial COVID-19 outbreak at another Illinois Veteran's Home in LaSalle County, IL with veteran deaths.

#### **4.11 The Medical Examiner-Coroner and Public Health: An Innovative and Collaborative Approach to the Covid-19 Pandemic: The Experience of Santa Clara County, CA**

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Santa Clara County (SCC), located in Northern California, was at high risk for early introduction of SARS-CoV-2 infections at the beginning of the pandemic, given its diverse population of approximately two million people

and hub of international travel. As of May 10, 2021, the County has recorded near 2,000 fatalities from coronavirus disease 2019 (COVID-19). Early COVID-19 concerns prompted a collaboration between the Medical Examiner-Coroner's Office and County of Santa Clara Public Health Department (SCCPHD), with the creation of a protocol that encompasses prompt disease reporting, death certification, enhanced surveillance of confirmed and suspected COVID-19 cases, the testing of postmortem samples, and detailed methodology for case investigation and contact tracing (CT), including postmortem CT with more extensive investigation performed on the three earliest confirmed COVID-19 deaths.

Since the early days of the pandemic, the Medical Examiner-Coroner in Santa Clara County requested that all deaths due to COVID-19 be reportable to the office. The majority of these were hospital deaths; however, persons who were found deceased in their residence, with or without medical history, who had exhibited flu-like illness prior to death were brought under jurisdiction of and examined by the Medical Examiner-Coroner. During the starting months of the pandemic, the Medical Examiner-Coroners autopsied all suspected COVID-19 deaths, and this proved critical to the understanding of how the virus affects the human host. The information for each COVID-19 death was reviewed by the Chief ME-Coroner and shared continuously with Public Health, becoming another valuable source for the PHD to identify populations at risk for COVID-19 in the community and to include decedents in contact tracing efforts when appropriate.

The postmortem contact tracing conducted by the Public Health Department of the three earliest COVID-19 deaths diagnosed by autopsy will be presented in detail at the conference, including the absence of significant travel history in any of the decedents within the month preceding their illness, indicating that these cases were the earliest known community transmission cases of COVID-19 in Santa Clara County and that therefore the virus was circulating in the community by January 2020 and potentially even the previous December.

The close Medical Examiner-Coroner relationship with the Public Health Department helped shed light on these early at-home COVID-19 deaths, which may have been otherwise overlooked, particularly in the unique scenario of ventricular rupture found in the earliest confirmed COVID-19 death in the United States.

#### **5.1 The Native American Graves Protection and Repatriation Act and the Medicolegal System: Legal Requirements for Offices and Practitioners**

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The purpose of this workshop is to provide attendees with an understanding of why and how the federal NAGPRA law applies to the medicolegal system when nonforensic Native American remains are submitted to medical examiner/coroner (ME/C) offices, and the possible repercussions for non-compliance. NAGPRA governs the treatment and disposition of Native American remains in any state office that receives federal funding and provides a legal pathway for Native Americans to claim and repatriate the remains of their ancestors. As ME/C offices receive federal funding and are often in the possession of nonforensic Native American remains, they fall within the legal purview of the law.

Medical examiner and coroner offices often come into possession of skeletal remains that are later determined to be nonforensic Native American remains. Currently, each office deals with these remains differently, perhaps turning them over to an archaeologist or university, following state laws regarding disposition, curating them indefinitely, or

reburying them. However, NAGPRA applies to ME/C offices as they meet the law's definition of a museum, meaning any institution or state or local government agency that receives federal funds and has possession of, or control over Native American cultural items, including human remains. The law stipulates how these remains should be dispositioned and lays out civil penalties and fines for institutions or agencies found to be noncompliant with the stipulations.

In order to operate in a compliant manner, this workshop will provide attendees with the knowledge and experience necessary to follow proper NAGPRA protocols. Repatriation of Native American remains is a multi-step process that includes consultation with Native American tribes in order to determine the cultural affiliation of these individuals. This workshop will provide training on this process, supported by case studies and hands on mock scenarios in order to cover the variety of situations medicolegal practitioners may find encounter when dealing with Native American remains.

After attending this presentation, attendees will (1) better understand the Native American Graves Protection and Repatriation Act (NAGPRA) and how it applies to the ME/C offices that come into possession of nonforensic Native American remains; (2) learn the legal responsibilities necessary to be compliant with the federal law and understand how and when NAGPRA compliant protocols should be followed; (3) learn how to complete each step of the NAGPRA process, including what types of evidence are used to determine cultural affiliation; and (4) learn best practices for communicating and consulting with tribes.

#### **6.1 Implementation of Digital Microscopy in a Combined Forensic and Hospital Autopsy Practice**

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In 2018, the Department of Laboratory Medicine and Pathology (DLMP) at Mayo Clinic in Rochester, MN began developing a five-year plan to transition to an entirely digital workflow, from slide review to case sign-out. This plan included extramural benchmarking, equipment acquisition, validation, and implementation. During the early stages of acquisition and validation, the COVID-19 pandemic disrupted existing workflows. However, it simultaneously presented a unique opportunity in that the Department of Health and Human Services (HHS) declared a public health emergency and the Food and Drug Administration (FDA) relaxed restrictions and provided guidance that allowed digital pathology slides to be reviewed remotely for the duration of the emergency. As the autopsy service was deemed an essential service during the pandemic, it was prioritized in this initiative.

Tissue slides were digitized directly after creation in the histology laboratory. The resident or pathologists' assistant associated with the case received the tray of glass slides per the original protocol, but an email also notified all associated parties that the slides were scanned and available for digital review. Once the slides were reviewed by the trainee, options for faculty sign-out included remote review through Zoom, or in-person review (with appropriate masking and distancing) of either digital slides or glass slides. Requests for additional sections and stains were conducted per the standard protocol, adding the scanning and email notification steps.

After a short adjustment period, users preferred digital interface to the glass slides. Currently, we find that most cases require no secondary review of the glass slides. As a teaching tool, the scans have proven to be extremely valuable. Trainees can annotate with single-cell precision and can add text questions or comments. There is no need to carry trays of slides around campus, as both trainees and faculty have simultaneous access to the digital slides. Photographs can be instantly captured while using the

software interface. Even "unknowns" conferences can be held live via Zoom.

Since the implementation of digital pathology in autopsy, our institution has expanded to include a subset of transplant pathology and selected consult cases. Digital microscopy will continue to scale up over the next few years and is anticipated to eventually include all aspects of anatomic pathology. While there are still some limitations, advancements in scanning and digital storage will continue to drive the practice for years to come.

#### **6.2 Sudden Infant Deaths with COVID-19: A Report of Three Cases**

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Severe Acute Respiratory Syndrome Virus-2 (SARS-CoV-2), the agent of COVID-19 disease, is much less likely to cause severe disease in children compared to adults. However, case series and epidemiologic studies demonstrate that certain pediatric populations, particularly infants (< 1 year old) and children with comorbidities, have an increased risk of severe disease and death. There have also been reports of a hyperinflammatory syndrome (MIS-C) and Kawasaki-like disease occurring in children which has the potential to cause morbidity and death. We present three cases of death in infants with laboratory-confirmed COVID-19 infection by polymerase chain reaction (PCR) taken from postmortem nasopharyngeal swab at autopsy. The infants were 1.5 months, 4 months, and 9 months old and were born at 37, 31, and 39 weeks gestation, respectively. One infant required five weeks of hospitalization in the neonatal intensive care unit after birth due to prematurity. Autopsies revealed no evidence of underlying natural disease or traumatic injuries and toxicology results were noncontributory. Microscopic examination of the lungs showed congested, thickened alveolar septae with interstitial lymphohistiocytic inflammatory infiltrate, consistent with COVID-19 infection. Two of the infants were reportedly asymptomatic in the days prior to death; one infant reportedly had a mild cough the day prior to death. The causes of death were determined to be pneumonia due to COVID-19. The circumstances of death are confounded by potential causes of asphyxia in each case, including co-sleeping, sleeping position, and lack of supervision. However, there was histologic evidence of viral infection and a detectable SARS-CoV-2 viral load by PCR in all three cases. We discuss the role of COVID-19 as the major contributor to death in each of these cases and the susceptibility of children in this age group to serious complications of COVID-19 infection. Notably, tissue from one infant was sent for viral sequencing. This infant was found to be infected with B.1.429 variant strain of SARS-CoV-2, which has mutations in several viral spike proteins, including the L452R mutation which is associated with increased infectivity and escape from neutralizing antibodies. As the population becomes vaccinated or infected, selection pressure may drive an increase in variant strains of SARS-CoV-2, potentially causing a shift in populations at risk and an increase in infant cases and mortality.

#### **6.3 Spontaneous Multiple Arterial Dissection in a COVID-19 Positive Decedent**

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Spontaneous multiple arterial dissection (SMAD) is a rarely reported phenomenon and has been previously linked to connective tissue diseases and specifically the genetic mutations in *SMAD3* and *COL3A1*. Herein we describe a case of SMAD with scattered thrombi in a COVID-19 positive patient with a history of unspecified mitochondrial myopathy. Vasculopathy involved the splenic artery, inferior mesenteric artery, internal mammary

arteries, omental arteries, mesenteric arteries, and small renal arteries. Dissections were confirmed by histology in the splenic artery, inferior mesenteric artery, and bilateral renal medullary arteries. Genetic studies were done to rule out *SMAD3* and *COL3A1* mutations. Since the *Smad3* protein has been previously implicated in COVID-19-associated tissue fibrosis, it may play a role in endothelial dysfunction as well.

### 6.5 Fatal Iatrogenic Intrapartum Neonatal Cervical Spinal Injury: One Pull Too Many

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The incidence of newborn traumatic injuries varies between 2 -7/1000 live births with fetal macrosomia, cephalopelvic disproportion, dystocia, prolonged labor and breech presentation as risk factors.

Spinal Cord Birth Injury (SCBI) in this setting is rare and its true incidence is difficult to determine since the spinal cord is not routinely examined at autopsy. SCBI most commonly occurs without bony injury, with a reported incidence of 10% in stillbirth/neonatal deaths and 1 in 29 000 live births. There has been a few cases with dislocated fractures of the cervical spine. The risk factors for SCBI consist of intrauterine hyperextension of the neck during vaginal delivery (25% incidence of cord transection), difficult delivery and forceps-assisted breech delivery. The mechanisms of injury include traction, hyperextension, and torsion.

Two major sites of injury are encountered with the lower cervical/upper thoracic region being preferentially damaged in breech delivery versus the upper to mid cervical region targeted in cephalic delivery. The clinical features of birth-related upper cervical spinal cord injury include apnea, flaccid quadriplegia, forceps-induced injuries, and even neonatal death.

There are two radiological categories of cervical spinal birth injury based on the absence or presence of bony injury on imaging. Spinal Cord Injury *Without* Radiologic Abnormality (SCIWORA) accounts for most cases of cord injury without bony injury whereas Spinal Cord Injury *With* Radiologic Abnormality (SCIWRA) defines cord injury with bony injury. SCBI with associated vertebral injuries is uncommon and can consist of vertebral fractures/dislocations or separation of the vertebral epiphysis. Rupture of an intervertebral disc with damage of the spinal cord at C6/7 during traumatic delivery is a recognised but rare complication which has been described during traumatic deliveries or with use of rotational forceps. It is postulated that forceful longitudinal traction combined with flexion and torsion of the vertebral axis is a possibility. Cervical spinal injury will result in difficult airway management, inclusive of unsuccessful intubation.

The delivery and death of a term baby girl who was delivered by forceps for shoulder dystocia after an uneventful pregnancy is presented to illustrate the severe end of the spectrum of cervical spinal injury with its attendant airway management difficulties and associated complications. Delivery was achieved after four attempts with rotational forceps. Bahl et. al (2007) reported an increased risk of neonatal trauma and admission to the special care baby unit following more than three pulls with forceps and sequential use of instruments.

### 6.6 Mob Justice Fatalities at the Pretoria Medico-Legal Laboratory: A Review

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"Mob Justice" deaths have become quite frequent in South Africa, being a form of unorganized and unplanned violent homicide which is typically perpetrated in an impromptu fashion by a group of individuals from a particular community, without due legal proceedings. This is particularly prevalent in impoverished communities with poor infrastructure, as seen in informal settlements and "squatter camps". There appears to have been a substantial increase in these deaths, possibly because citizens have lost faith in the ability of police services and criminal justice systems to keep law and order.

Pretoria is the capital city of South Africa and the Pretoria Medico-Legal Laboratory (forensic mortuary) serves a largely urban population of almost three million people, many of whom live in informal settlements. Although a few studies have been published from other urban centres in South Africa and from other African countries, the victim profile, pathology and other medicolegal postmortem findings associated with such fatalities, have not been widely reported.

A study was undertaken to evaluate the demographic profile and other forensic medical findings in respect of fatally injured victims of mob justice who were admitted to the Pretoria Medico-Legal Laboratory over a six-year period from January 2011 to December 2016. Out of a total of 11 551 admissions over the study period, 204 mob justice fatalities were identified for inclusion in this study, with case numbers varying between 22 and 42 per annum.

The majority of the victims were young males between the ages of 16 and 40 years who had suffered extensive blunt force injuries, most succumbing to head injuries. However, a significant number of cases with widely divergent injuries as well as stab wounds, burn wounds (including so-called "necklacing") and (relatively few) gunshot wounds, were identified. A finding of particular interest is that a substantial number of individuals appeared to have minimal injuries or underlying pathology, as identified at autopsy or upon histology, suggesting that neurohumoral pathways may be implicated in the demise of a portion of these victims.

The findings of this study will be presented, with reference and comparison also to the findings of other similar studies and in particular, with presentation of visual material of typical and unusual injuries and injury patterns as seen at autopsy. In particular, attention will be drawn to the mechanisms of death that may be implicated in cases where overt or severe traumatic pathology was not identified at autopsy.

### 6.7 A Review of Asphyxial Deaths Resulting from Constrictor Snakes: Including Actual Video Demonstration

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Since the late 80's there has been a growing number of asphyxial deaths resulting from interaction of human and constrictor snakes. In approximately 2019, the number of these asphyxial deaths begin to increase year after year into present day. The primary culprit in these snake related asphyxial deaths has been attributed to the explosion of exotic pet sales being primarily compromised by constrictor snakes. Large exotic reptile shows operating in all states offer the general public not only exotic large lizards and venomous snakes, but the biggest sales are those of large constricting snakes. The most prolific constricting snakes being sold range from the common red-tailed boa constrictor to mammoth constrictors such as Burmese and Reticulated pythons and the Green anaconda. These mammoth constrictors as pets may start out as being a foot or two in length but can easily grow in a relatively short period to a length in excess of 20 feet and weigh several hundred pounds. There are many misconceptions in the general public that these constrictors make great pets and bond with

their owners in such a way that would never attack nor possess the capacity to easily asphyxiate an adult human with a single muscle contraction of their powerful bodies. Many scientific studies have been conducted demonstrating the constriction power of not only the giant constrictors but even small seemingly harmless constrictors such as corn, rat, and king snakes. These common snakes of North America do have the capability under the right circumstances to cause asphyxiation of an adult. A study by National Geographic found the common California king snake, which can grow up to six feet and weight of approximately four pounds, has the strongest constriction strength proportionate to the body and size of any other snake in the world. The king snake is capable of a constriction force ranging between .7 to 6 pounds. During this presentation, I will present a short overview of the basic pathophysiology parameters of strangulation and the resulting cerebral hypoxemia and death. Also, to be presented are numerical data regarding the number of constrictor related deaths in the US as well as the types and sizes of the constrictors involved. To demonstrate how fast and easily a constrictor snake can kill an adult human, I will present two videos of individuals who are calmly handling their pet constrictors that in a matter of seconds strangle the owners to death.

#### **7.1 Occupational Safety and Health Administration (OSHA) Investigation of an Occupational Diving Death**

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<sup>1</sup>*Occupational Safety and Health Administration, Washington, District of Columbia, USA*

A commercial diver performing a surface supplied air dive at a hydroelectric dam was tasked to relieve a drain pipe blockage using a power washer. After descending more than 100 feet into a contiguous, 16-foot diameter intake pipe and inserting the power washer into the blocked drain pipe, the power washer was turned on and the blockage was relieved. However, contact was immediately lost with the diver. He was quickly retrieved and found unresponsive. Emergency medical service workers were unable to resuscitate him, and he was found to have sustained multiple fatal traumatic injuries. The mechanism of injury is discussed, and preventive measures are proposed. The benefits of open communication between OSHA Area Offices and coroners/ medical examiners is stressed.

#### **7.2 Acute Esophageal Necrosis (AEN): 57 cases of "Black Esophagus" in a Medical Examiner Population**

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Acute esophageal necrosis (AEN) is a reportedly rare condition that is characterized by circumferential black discoloration and mucosal necrosis of the distal esophagus, "black esophagus." Fifty-seven medical examiner cases with this condition were identified from four medical examiner offices from 1993 to 2020. The average age of these individuals was 53 years and men outnumbered women 4.2 to 1. Ninety-eight percent of the decedents with acute esophageal necrosis were White. The most common underlying conditions associated with acute esophageal necrosis were chronic alcoholism (74%) and diabetes mellitus (23%). Thirty (52.6%) of the cases with acute esophageal necrosis were from 2018 to the present. The pathophysiology, gross and histologic pathology, and other pertinent features of acute esophageal necrosis will be discussed.

#### **7.3 Dormant Volcanic Lake Gases: A Case Report of Two Mass Casualty Events**

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This presentation details the circumstances of two events previously unpublished in the forensic literature. On August 15, 1984, in a remote village in Cameroon, 37 people died under unknown circumstances in a mass casualty event. Subsequent investigations revealed no definitive cause for the event. Two years later, in August of 1986, an event matching eyewitness accounts of the first disaster occurred 200 kilometers away and resulted in the deaths of over 1700 people. Subsequent investigations by the United States Geological Survey and local authorities detailed a series of events explaining the nature of both disasters. In equatorial Africa, natural lakes formed in the caldera of dormant volcanos are subject to unique conditions that create a layered profile of gas concentrations from their surfaces to their deepest points. Dissolved gases from volcanic rock leech into the cold deep waters and remain there at increased concentrations because these meromictic lakes do not undergo seasonal mixing of deep and surface waters. Sudden mixing causes deep waters to rise to the surface resulting in a rapid change in solubility characteristics; long-stored suffocating and irritating gases are released into the environment above and around the lakes. Such lakes are known to exist in equatorial regions and often adjacent to population centers with hundreds to hundreds of thousands of people. The documented events not only explain what has happened to these populations when exposed to released gases from meromictic lakes, but also serve as a warning of what can happen again to other regional populations, possibly on a much larger scale.

#### **7.4 The Intraluminal Migratory Enigma of a Gossypiboma.**

*A.E. Walker<sup>1</sup>*

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The term gossypiboma describes a surgical sponge or gauze that is left involuntarily in the body after a surgical procedure. It is a rare postoperative complication. Most gossypibomas are discovered during the first few postoperative days but they can remain asymptomatic and undetected for years. The incidence of retained foreign bodies following surgery is 0.001-0.01% and gossypibomas account for 80% of cases with most in the abdominal cavity. The exact incidence is difficult to establish due to a reluctance of reporting.

Case reports of the relatively rare intraluminal migration of gossypibomas into the intestinal tract exist in the medical literature with the clinical presentation of intestinal obstruction. Intraluminal migration has been reported up to 14 years after cholecystectomy.

Pathologically, a retained sponge may incite a foreign body reaction of one of two types: either (1) formation of foreign-body granuloma with an aseptic fibrinous response or (2) an exudative reaction with abscess formation. Intraluminal migration of a retained sponge into the bowel lumen is much rarer compared to abscess formation. It involves necrotic inflammation of the intestinal wall followed by closure of the intestinal loop after complete migration of the sponge.

The case of a 90-year-old woman with an extensive medical and abdominopelvic surgical history, with a clinically documented retained surgical sponge attributed to a right salpingo-oophorectomy operation (1998), is presented. She died in-hospital in November 2016 after having presented eight days earlier with a 3-4 week history of abdominal pain and a two-week history of diarrhea. Colitis with partial large bowel obstruction was seen on imaging. Her white blood cell count was elevated but blood cultures were negative. The differential diagnoses were infectious colitis, inflammatory colitis, and bowel obstruction secondary to the intraluminal migration of her gossypiboma. Microbiological examination of the stool was negative. Despite treatment, she deteriorated and died.

Postmortem examination revealed a 16 cm x 6 cm intraluminal colonic foreign body mass that consisted of a surgical gauze admixed with fecal material which was associated with histologically confirmed stercoral ulcers in the affected segment, without gross perforation of the bowel, intra-abdominal abscess or peritonitis. Histologically, the stercoral ulcers were full-thickness with active chronic inflammation that had extended into the overlying peri-colic adipose tissue. Death was attributed to the effects of her large bowel obstruction superimposed on her underlying chronic cardiorespiratory diseases.

This case is presented to share a rare iatrogenic complication that remains a medical mystery.

### 8.1 Point-of-Care Testing for Drugs at Autopsy: A Presentation from the NAME Toxicology Committee

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Point-of-care (POC) testing is medical diagnostic testing that is performed near the patient. It is a proven approach that is well utilized for clinical applications and designed to offer reliable and faster turnaround time of laboratory test results. Examples of target analytes include glucose, electrolytes, cardiac biomarkers, viral load, and drugs. Point of care testing can also be performed in the autopsy suite. Benefits include the ability to quickly learn if the decedent has used drugs and then make a real-time decision about autopsy requirements and any further toxicology testing. Like any other analytical test, however, it is relevant to ensure the method fulfills its intended use, so effective decisions and interpretations are made by the end user. In this regard, it is important to collect analytical evidence that shows appropriateness of use in the postmortem setting. Postmortem testing differs from clinical testing in that pre-analytical variables that are controlled for the living patient (e.g., draw time relative to dosing) are nonexistent in the postmortem patient. Decomposition, putrefaction, hemolysis, matrix availability, and sample volumes are variable from patient to patient. Furthermore, POC drug testing is not typically followed by confirmation testing in the clinical setting which is a common standard in the forensic setting. Questions related to POC testing in a postmortem setting include validation testing of postmortem specimens and attribution of cause and manner of death based on POC test results in the absence of additional testing or workup. While POC tests serve a particular need and purpose, it is relevant to know and understand the benefits and risks associated with this type of testing. To determine the prevalence and applications of POC testing within the NAME membership, a survey was sent via the NAME Listserv in April 2021. The survey poses a series of questions to those who use and do not use POC tests. Questions pertain to the analytical parameters (e.g., matrices tested, cross-reactivity, analytical scope) as well as addressing how test results are used and relied upon. An opportunity to provide any feedback or comments was also afforded to the respondents. The results of the survey will be presented and reviewed in conjunction with case-based examples where POC testing was used.

### 8.2 National Forensic Laboratory Information System (NFLIS) and Medical Examiner and Coroner Offices, the Virtual Resources Provided by NFLIS

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The National Forensic Laboratory Information System (NFLIS) is a long-term national drug surveillance program of the Drug Enforcement

Administration's (DEA) Diversion Control Division. Since its inception in 1997, NFLIS has provided a systematic approach for collecting data on solid-dosage drug analyses conducted by federal, state, and local forensic laboratories across the country. This component of NFLIS is called NFLIS-Drug. NFLIS-Drug is a voluntary program consisting of over 280 individual forensic laboratories. NFLIS-Drug has provided the DEA with an efficient, reliable, and comprehensive data resource for monitoring drug scheduling actions; tracking drug trends; and identifying new substances of use, misuse, and abuse. The DEA has enhanced its efforts to combat diversion and identify new and emerging substances of misuse and abuse by expanding the NFLIS program to include medical examiner and coroner offices (NFLIS-MEC), regarding deaths in which drugs were identified and public and private toxicology laboratories (NFLIS-Tox), on toxicological findings from antemortem testing (e.g., hospitals, driving under the influence/driving under the influence of drugs, human performance testing, pain management clinics). NFLIS-Tox and NFLIS-MEC complement NFLIS-Drug and further support the DEA's drug regulatory and scheduling efforts. This presentation provides an overview of NFLIS, resources NFLIS provides to the community, information on participating in NFLIS, examples of drug trend data, and information on the NFLIS-MEC survey.

NFLIS provides participants with several resources. One is the NFLIS Data Query System (DQS) which is an online database that participants can generate data pulls at the state, regional, and national level and graphic displays of drug trends. Once NFLIS-MEC has enough offices reporting their drug data, participating offices will have further access to run reports specific to their office and be able to compare their office specific findings against aggregated statistics. NFLIS-Drug publishes Midyear and Annual reports that includes the top 25 most identified drugs, drug trends on synthetic cathinones, synthetic cannabinoids and other drug categories. These data can inform MDI offices of current drug trends. Lastly, NFLIS offers the Synth-Opioids Real Time Communication Network which is a multidisciplinary forum for approved users to discuss emerging drug trends. Forum users share information across states and disciplines on novel drug forms, new drugs identified, and assistance with identifying unknown substances. All of these resources can be particularly useful to MDIs when a new drug in emerges in the community and want to know more information or alert others about the substance.

### 8.3 Acute Respiratory Failure as a Consequence of Synthetic Cannabinoid Intoxication, Masquerading as Apparent Opioid Related Death.

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Synthetic cannabinoids (SC) continue to be a significant part of illicit drug markets and result in emergency department admissions and deaths, particularly among vulnerable populations including youth, the homeless, injecting drug users, and correctional populations. These drugs were initially thought to be simply a novelty and cannabis-like; however, over time the range of chemical entities in this class have evolved as clandestine chemists have created new classes of drugs with potent cannabinoid receptor (CB1) binding properties. Synthetic Cannabinoids are also increasingly encountered in polydrug intoxication cases, in combination with opioids and stimulants.

Adverse effects associated with synthetic cannabinoids include physiological or psychological distress (including anxiety, aggression, agitation, tachycardia, lethargy, loss of consciousness) and various forms of psychomotor impairment. Acute kidney injury has also been reported and deaths attributed to synthetic cannabinoid intoxication are now more frequent.

In recent years, emerging SC have been detected in clinical overdose cases where opioid use was suspected where acute respiratory failure was observed, and opioid use was suspected but in which only SC were present after extensive toxicological investigations including testing for legacy and emerging opioids. Additionally, fatalities have been reported where autopsy findings suggested opioid overdose, but only SC were present.

Our data include a series of apparent SC intoxication cases with acute respiratory failure. In almost all cases, naloxone had been administered with the goal of reversing perceived respiratory depression. The drugs detected in these cases involved current generation SC, including 5F-MDMB-PICA and its metabolite 5OH-MDMB-PICA, ADB-FUBINACA, AB-CHIMINACA, AB-FUBINACA, AB-PINACA, MDMB-4en-PINACA, and 4F-MDMB-BINACA.

The same compounds have been identified in apparent drug-related fatalities where naloxone was present, and toxicology testing for opioids was pursued, but SC were the only significant finding.

While the mechanism of SC-related respiratory depression is unclear, it has been reported by other authors. Proposed mechanisms may include increase in bronchial airway resistance as a result of activation of peripheral baroreceptors and chemoreceptors, CB1 receptor stimulation, interaction between the endocannabinoid and endogenous opioid systems, and SC activation of non-CB1 receptors.

These cases confirm that patients suffering from SC intoxication have experienced acute respiratory failure, which may clinically present as an opioid overdose prompting administration of naloxone. There are mixed data as to whether naloxone is effective in treating SC related respiratory depression and further work is needed. In cases of apparent opioid overdose where opioids are not detected, synthetic cannabinoids should be considered.

#### 8.4 Novel Psychoactive Substance (NPS) Discovery: Evaluating the Rise and Fall of Novel Synthetic Opioids (NSO) and Other Novel Psychoactive Substances in Postmortem Toxicology in the United States

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Following the disappearance of the more esoteric fentanyl analogs in 2019, there has been a steady stream of novel synthetic opioids (NSO) that have made death investigations and forensic toxicological analysis more complex. These new drugs frequently appear, contribute to overdoses and deaths typically for a period of less than a year, and are then succeeded by new illicit drugs. Having a means of rapidly identifying and characterizing these newly emergent compounds and documenting their involvement in deaths and overdoses can accelerate the process of collecting epidemiological data, adding drugs to routine testing scopes, detecting additional drug-caused and drug-related deaths, and assisting with getting the drugs scheduled.

Under the NPS Discovery Initiative, we developed a five-step process of: intelligence gathering; surveillance; monitoring; response; and forecasting, to anticipate and document the discovery, appearance, proliferation and decline of NSO's in drug caused deaths. De-identified raw high-resolution mass spectrometry (HRMS) data files from routine postmortem toxicology drug screening from NMS Labs are data-mined both prospectively and retrospectively to make these identifications. Data acquisition is performed in nontargeted mode allowing comprehensive high mass-accuracy data to be archived for subsequent data mining/reprocessing. The postmortem HRMS data are searched against a library of more than 900 drugs including

legacy drugs of abuse, drug synthesis by-products and precursors, and other emerging NPS and their metabolites.

Findings from postmortem data mining are considered together with seized drug data, web drug-user intelligence, government reports, peer-reviewed publications, gray-market web-based drug sales activity, scheduling actions, and other sources to determine what new drugs to monitor.

Between 2016 and 2021, over 300 000 postmortem toxicology data files have been reprocessed. Using this approach, NPS Discovery has identified 30 NSOs, and 7 NSO precursors during that time period. These data are considered together with seized drug data, web drug-user intelligence, government reports, peer-reviewed publications, gray-market web-based drug sales activity, scheduling actions, and other sources to determine what new drugs to add to drug monitoring scopes.

This presentation will include a description of the use of this approach to track the rise and fall of one of the most recent emerging NSO's, the novel benzimidazole opioids isotonitazene, mesonitazene, etodesnitazene, and flunitazene, which were identified beginning in Q3 2019, and appeared in succession over the following two years, to which over 350 deaths have been attributed. Metonitazene is currently the most prominent of these NSOs. Isotonitazene was scheduled in August 2020, based in part on these data.

#### 9.2 Intrinsic and Extrinsic Autopsy Findings in Sudden Unexplained Death in Childhood (SUDC)

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Introduction: Sudden unexplained death in childhood (SUDC) is the sudden unexpected death of a child 12 months and older where the cause of death remains unknown after a complete investigation, including review of medical history, circumstances of death, and complete autopsy. Sudden unexplained death in childhood encompasses a heterogeneous group of pathologies. To improve our understanding and surveillance, the National Association of Medical Examiners Panel on Sudden Unexpected Deaths in Pediatrics advocates for synoptic reporting with documentation of intrinsic and extrinsic factors in SUDC. Intrinsic factors include abnormal physiological or anatomic findings that may contribute to death. Extrinsic factors are environmental factors that may possibly threaten life. Currently, neither of these two factors convey a causal relationship and the clinical significance of these findings is unknown.

Methods: We analyzed the first 77 confirmed cases of SUDC reviewed retrospectively by the SUDC Registry and Research Collaborative (SUDCRRCC) across four years to determine prevalence, distribution, and clinical significance in SUDC pathogenesis. The completed autopsy reports, investigative reports, histopathology slides, ancillary test results, and cardiac and neuropathology consult reports for each case were assigned to be independently reviewed by two or more board-certified forensic pathologists on the SUDCRRCC.

Results: Of the 77 unexplained cases, 93.5% had one or more intrinsic factors and 70% had one or more extrinsic factors. Those with intrinsic factors were nonuniformly distributed across organ systems; most involved the respiratory tract (39%), central nervous system (37.7%), and cardiovascular system (6.5%). Almost half (48%) of cases with intrinsic factors had at least one histopathologic finding; most were inflammatory infiltrates in the lower respiratory tract. History of febrile seizures was the most common intrinsic CNS factor. Thirteen percent of cases identified a molecular variant of unknown significance. Some cases (9.1%) reported family history of seizure or arrhythmia. The majority of the extrinsic factors were related to the sleep environment, with prone and face-down positioning the most commonly reported.

Conclusion: Forensic pathologists need to be aware of the spectrum of autopsy findings in SUDC to avoid erroneously attributing a death to subtle nonlethal findings. Additional studies are required to fully characterize the spectrum of findings and assess their significance in SUDC pathogenesis. When insufficient evidence is present to fully explain death, investigators should convey this through certification as SUDC as well as using synoptic reporting with documentation of intrinsic and extrinsic factors to improve accurate surveillance and follow-up care for families.

### **9.3 Removing the Term “Unprintable” from the Medical Examiner/Coroner Dictionary (New Postmortem Fingerprinting Resources)**

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One of the most efficient and effective ways to identify a decedent is through the use of fingerprints. For cases not exhibiting decomposition or trauma to the bodies, the only real issue is finding an antemortem fingerprint record to use for comparison. However, when environmental influences, such as fire or maceration, impact human remains, most offices are quick to label the case as “unprintable.” To fingerprint the more difficult deceased cases, there is a required learning curve and some additional materials, but unless the hands have completely skeletonized, postmortem prints should not be ruled out. In an age where it can be difficult to find the time to research and read journal articles, we have attempted to address the postmortem printing training gap by creating a 10-part video series, available for free to anyone who wishes to learn. In this presentation, we will cover all the material that is represented in these videos, how to access them, and why time is rarely on your side for postmortem printing. Additionally, we will outline some of the new services provided by the FBI Criminal Justice Information Services (CJIS) Division and the collaborations with the FBI Laboratory Latent Print Unit. These new resources will add another tool to your toolbox to quickly help with backlogs by reducing the unknown population in your facility. We hope, after viewing this presentation, that you feel more empowered to go after the more difficult fingerprinting cases and get the deceased the true identity they deserve.

### **9.4 National Missing and Unidentified Persons System (NamUs) and the National Center on Forensics: An National Institute of Justice Update**

*C. Heurich<sup>1</sup>*

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The National Institute of Justice (NIJ) has funded and managed the National Missing and Unidentified Persons System, NamUs, since 2007. In 2021, the program was transferred to a contract held by Research Triangle International (RTI). In 2020, NIJ awarded a new program, the National Center on Forensics to George Mason University. This presentation will discuss both programs, their progress and any changes.

### **9.5 The National Institute of Justice’s (NIJ) Research and Development (R&D) Programs to Support the Medicolegal Death Investigation Community**

*D.L. McLeod-Henning<sup>1</sup>*

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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.

This presentation will discuss two forensic science R&D funding opportunities issued by the NIJ: Research and Development in Forensic Science for Criminal Justice Purposes and Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Forensic Laboratories. The specifics of these R&D funding opportunities will be discussed and recent investments relevant to the medicolegal death investigation community will be shared. This presentation will provide an opportunity for the audience to learn more about NIJ’s R&D efforts to support the medical examiner/coroner community.

### **9.6 The Evolving Death Certificate from Paper to Electronic Format**

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During the past two decades, the death certificate has evolved from paper to an electronic format, with nearly all states having some electronic death registration. This transformation has been shown to provide timelier certification and is reportedly more convenient. In addition to electronic death reporting, some states have enhanced their systems to allow mobile certification (i.e., mobile apps) as well as interoperability between coroner and medical case management systems and electronic death registration systems.

To promote consistency and uniformity in death reporting both domestically and internationally, the National Center for Health Statistics issues a United States Standard Death Certificate, and while each state has their own version of the certificate, they comply with the US standard as well as the format as described by the World Health Organization’s International Classification of Diseases. NCHS last issued standard certificates of live birth and death and the report of fetal death in 2003 after much collaboration with state vital statistics offices and other stakeholders, including medical examiners and coroners. The revision process is generally carried out every 10 to 15 years following a protocol that has been described elsewhere, which includes an extensive evaluation and feedback. Prior to 2003, the most recent revisions were implemented in 1989.

This presentation will describe the features of the US Standard death certificate and present some of the essential components for uniformity and consistency between states and counties. In addition, to the paper format of the certificate, the impacts of electronic reporting and electronic systems will be highlighted. This includes discussion of flexibility of electronic systems to allow a recent trend with vital registration offices to issuing fact of death certificate in addition to the traditional certificate that includes causes of death – a change suggested by medical examiners and coroners. Looking to the future, the presentation will include points of

discussion among the certifier community including manner of death variations and suggestion (e.g. therapeutic complications), sex at death, and options for date and time of death such as allowing range rather than a single date and time (e.g., pronounced). This presentation is intended to spark discussion around opportunities as death certification moves into a purely electronic format.

### 10.1 The Provision of Forensic Pathology Services in Trinidad and Tobago: Past, Present, and Future

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Trinidad and Tobago is a democratic republic 6.8 miles off the coast of Venezuela with a population of 1.4 million. Akin to most jurisdictions in the Caribbean region, the development of a properly structured medicolegal death investigation system has remained elusive for decades. Initially, forensic pathology services were provided by surgical pathologists in hospital morgues. In 1983, the Trinidad and Tobago Forensic Science Centre was established and but has largely been staffed by professionals trained in forensic medicine rather than forensic pathology. The medicolegal autopsy service has been delivered by seven practitioners since its inception. Currently, it is staffed by two medical officers, six mortuary attendants and one radiology technician who operate a single operational autopsy room with one autopsy station and a nonfunctional x-ray machine to cover approximately 1000 medicolegal autopsies per year, of which approximately 500 are homicides. There are many challenges to be overcome to provide a quality service.

This presentation will provide a historical overview of the forensic pathology service from the perspective of the first and only US-trained, board certified forensic pathologist who had returned to the twin-island state with a vision to improve the service. It will outline the challenges faced and required short and long term plans for improvements in service delivery.

### 10.2 Patterns and Prevalence of In-Custody Deaths and Disappearances in Sub-Saharan Africa

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Objective: To review the etiology and prevalence of in-custody deaths in parts of sub-Saharan Africa (SSA). Although such deaths receive international attention when they occur in Western countries, especially the United States, there is little media attention when they occur in SSA.

Methods: We reviewed data on in-custody deaths occurring in two countries in SSA. The data was derived from information provided by local and international nongovernmental organizations and human rights groups. These were correlated with academic publications describing the epidemiology of medico-legal autopsies (using search terms on PubMed: "in custody deaths, Nigeria", "police killings, Nigeria", "in custody deaths, Kenya", "police killings, Kenya") and reports on in-custody deaths overseas derived from country reports prepared by the US State Department and Amnesty International.

Results: Most credible information on in-custody deaths comes from online databases maintained by nongovernmental organizations. Most deaths were extrajudicial killings due to gunshot wounds. In several cases, arrestees simply disappeared without trace.

Kenya - Between 2017 and 2020, there were 541 killings and 227 enforced disappearances; 60% of victims were men. Most killings occurred in Nairobi

county (8% of Kenya's population). Almost half of the killings (46%) occurred during so called "anticrime operations". No ethnic breakdown was described. No published articles were found on in custody deaths in Kenya.

Nigeria- Between 2004 and 2020, there were an estimated 71 040 killings by law enforcement. Causes of death were not provided though the vast majority of victims are very likely men killed by firearms and to a lesser extent by torture or beatings. Victims were "suspected" armed robbers or targets of extortion or bribe. Of 11 articles (published between 1997 and 2020), a single study from the Office of the Chief Medical Examiner of Lagos State (6.5% of Nigeria's population) analyzed 45 in-custody ("in jail") deaths in 9894 autopsies conducted between 2008 to 2019. The leading causes of death in this series were hypertensive heart disease and blunt force head trauma. No official statistics are available since death registration is not universal and neither autopsies nor inquests were regularly performed even when required by law.

Conclusion: In parts of SSA, formal mechanisms to document in-custody deaths lack financial and institutional support. Most victims are males who were shot to death during arrest or were beaten or tortured to death in jail. Improved data collection is required to accurately capture the magnitude of the problem.

### 10.3 WITHDRAWN

### 10.4 Can We Come to the Same Conclusion? The Utility of Autopsy Findings when Determining Causes and Manners of Death.

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Introduction: The autopsy has been the gold standard for definitive diagnosis; however, utilization of the autopsy has steadily declined in the United States. In the field of forensic pathology, offices have begun to question the utility of the autopsy as they struggle with an increased burden of cases, largely due to the opioid epidemic and now amplified by the COVID-19 pandemic. This survey-based study provided (or withheld) full autopsy findings to individuals who self-identified as primarily medical examiners and/or coroners, either with and without specialized training in forensic pathology, with the aim of comparing cause of death (COD) and manner of death (MOD) determination in selected scenarios.

Materials and methods: De-identified data from the Jefferson County Coroner/Medical Examiner's Office (JCCMEO) database was used to create case vignettes. The 15 vignettes were created; one set included information from the internal examination and one set did not. The membership of the National Association of Medical Examiners (NAME) was invited to classify the COD and MOD for all fifteen vignettes. The consensus between the COD and MOD for survey respondents who had information from the internal examination (i.e., full autopsy findings) and those who did not have information from the internal examination was calculated.

Results: The consensus for the two groups ranged from 100-47% for MOD. The consensus for the two groups ranged from 99-35% for COD. The vignettes that had the highest consensus for MOD among both groups of respondents were classified as "homicide". Consensus among determination of "accident" was found in five vignettes and "natural" in only four. For one vignette, respondents had the highest consensus in classifying it as "undetermined". Of the cases determined to be "homicide" by respondents from each group, the consensus for COD ranged from 98-75%. For the vignettes determined to be "accidents", consensus in COD

designation ranged from 98-73%. For the "natural" deaths and the "undetermined" death, consensus for COD designation ranged from 72-35% and 95-86%, respectively.

Discussion: The findings from this study suggest that medical examiners and/or coroners demonstrate consensus ranging from 99-70% on the COD determination with or without a full autopsy in deaths classified as "homicides", "accidents", and "undetermined". For "natural" deaths, there was a significant lack of consensus among respondents when indicating the cause of death regardless of access to the complete autopsy findings (including an internal examination).

### 10.5 A Survey of Deaths due to Law Enforcement Intervention in Five Western Countries

K. obenson<sup>1</sup>

<sup>1</sup>DALHOUSIE UNIVERSITY- SAINT JOHN, SAINT JOHN, Canada

Objective : To explain the prevalence and pattern of arrest-related deaths in 5 Western countries (Australia, Canada, New Zealand (NZ), the United Kingdom (UK) and the United States (US).

Methods : Data from government websites, internet databases of journalist watch dog or human rights groups was examined for law enforcement fatalities occurring during arrest. Results were analyzed.

Results : Reliable government statistics are lacking. The US has the highest number of law enforcement arrest deaths and per capita the highest number of shooting deaths; most recent statistics per 100 million population report 335 in the US, 98 in Canada, 85 in Australia, 20 in New Zealand and five in the UK. Per FBI, up to 45% are justifiable. In all the other countries except the UK, patrol officers carry or have emergent access to firearms. In all countries most victims are male. In the US, Black people are 3 times more likely to be shot dead than their White peers. Black women were 1.4 times more likely to be shot dead as their White peers. Unarmed Black people are 1.3 times as likely to be shot as their White peers. The risks of being killed by police declined for all age groups >60 but remained higher for longer in Black adults. Most killings begin as minor traffic stops, mental health checks, domestic disturbances and nonviolent disturbances. In Canada, there were 460 arrest related deaths over an 18-year period ending 2017, 70% of which involved firearms. Indigenous Canadians were almost eight times overrepresented. In Australia, police shot 47 people dead over a 10-year period ending 2017 of which two were indigenous persons. In NZ, fatalities rates were higher in individuals with mental health issues. Over a 10-year period ending 2017, nine of 16 people killed were visible minorities. The minority of deaths in the UK involved firearms. Black people were at least three times overrepresented among police action deaths. Restraint associated deaths in the US are more often blamed on the victims underlying medical condition (heart disease, cocaine or other drug use, underlying mental health issues) than on law enforcement intervention.

Conclusion: Law enforcement related arrest deaths are an international phenomenon that in some Western countries disproportionately impacts visible minorities. In the US, law enforcement kills approximately 1000 people per annum (6 to 7% of all homicides). Most reliable statistics about police killings come from nongovernmental agencies.

### 10.6 WITHDRAWN

### 10.7 Assessing Mortality and Morbidity after Large-Scale Disasters: Recommendations from the National Academies of Science 2020 Report

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<sup>1</sup>Fierro Forensics, Henrico, Virginia, USA

The National Academies of Science convened a committee in 2019-2020 to study difficulties in collecting accurate mortality and morbidity data after large-scale mass disasters. The report was in response to the wide disparities in mortality and morbidity data after Hurricane Maria devastated Puerto Rico. Death counts varied from double digits to retrospective studies that produced numbers in the thousands. Panelists agreed a better framework was needed to assist medicolegal death investigators (MDIs) and health care providers in data collection to see the impact of a disaster. Several recommendations directly impact medical examiner/coroner systems (ME/C).

Recommendations are:

- Federal agencies should adopt a uniform framework for assessing disaster-related mortality and morbidity before, during, and after a disaster.
- Both individual counts and population estimates should be used as accepted standards for reporting mortality by state, local, tribal, and territorial (SLTT) entities.
- The CDC through the National Center for Health Statistics (NCHS) should incentivize and strengthen existing death registration systems and ME/Cs to improve disaster-related mortality data.
- The NCHS should update/revise the Model State Vital Statistics Act to drive uniformity of disaster-related mortality data. For example: Death certificates that do not identify the disaster are not coded as disaster-related. Because there is no item on the death certificate asking if a death was disaster-related, the committee recommended a drop-down box to collect specific disaster information. Deaths are not attributed to a disaster by some systems unless due to the actual physical forces when, in fact, a death may be indirectly disaster-related due to unsafe or unhealthy conditions while preparing, responding or during recovery. Partially attributable deaths (i.e., where the disaster likely contributed to the death) are not identified or counted.
- Agencies should adopt the CDC Terminology for attribution of deaths as direct, indirect and partially attributable death as uniform framework for reporting mortality.
- The CDC and professional associations, (NAME, IAMEC, AAFS) should strengthen MDI systems to improve investigation, training, data development and collection, and case management.
- Emergency management departments should integrate MDIs and death registration systems in preparedness and training.
- Move mortality management out of Emergency Support Function #8 (ESF8) and create a separate ESF dedicated to mortality management to assess mortality during and after disasters.

Reference: Available Free: National Academies of Sciences, Engineering and Medicine 2020. *A Framework for Assessing Mortality and Morbidity After Large-Scale Disasters*. Washington, DC. The National Academies Press. <https://doi.org/10.17226/25863>

### 10.8 Courtroom Testimony Training for Professional and Expert Witnesses: A Model

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Forensic medicine training is nonexistent in modern medical curricula. For many medical graduates, there was no formal training on the structure and function of the judicial system and courts. Generally, no courtroom testimony training is provided for undergraduate medical students, interns/residents and qualified specialists at any level of training, although some medical disciplines place the practitioner at a greater risk of being

called to court as either a professional or expert witness, such as forensic pathologists, child protection pediatricians, surgeons, emergency medicine physicians, and psychiatrists.

Possessing a medical degree does not automatically confer the ability for doctors to write excellent medicolegal reports and appear in court as excellent witnesses who can deliver valid, credible, and judicially beneficial oral testimony to assist the trier of fact in their deliberations. Most medical doctors are clueless as to their expected role as either a professional or expert witness in a judicial proceeding when called to testify. However, it is generally assumed that doctors are intelligent enough to deliver appropriate oral testimony to the same high standard that is expected in their clinical practice, but this is a fallacy. Most doctors become petrified at the mere thought of having to testify in a legal proceeding, be it an inquest, preliminary hearing, criminal trial, civil litigation matter, or otherwise. Their anxiety and mental anguish increase exponentially when that doctor's professional conduct or clinical expertise is the subject of the said legal proceeding as can occur in their defence of civil suits.

This presentation will 1) review the types of scenarios and courts where the delivery of oral testimony can be required of doctors, 2) enumerate the reasons why formal courtroom testimony training for medical doctors is necessary and 3) review the classification of witnesses, evidence types, burden and standard of proof and 4) provide an overview on the model of courtroom testimony training that has been developed, introduced and delivered successfully for postgraduate residents in anatomical pathology, fellows in forensic pathology, and various faculty members of the Faculty of Medicine, University of Ottawa, with expansion to other professionals such as staff of the St Lucia Forensic Science Laboratory (2018 and 2021) and the Belize National Forensic Science Services (2021).

The principles of courtroom testimony training which will be presented are applicable to any medical practitioner and all other categories of professionals who can be called to testify either as professional or expert witnesses.

#### 11.1 Dr. Charles Hirsch: Mentor, Teacher, Researcher, and Certifier

*J.R. Gill<sup>1</sup>, S.F. Ely<sup>2</sup>*

<sup>1</sup>CT Office of the Chief Medical Examiner, Farmington, Connecticut, USA;

<sup>2</sup>NYC Office of Chief Medical Examiner, New York, New York, USA

This is hoped to be the first in a series of an annual presentation highlighting the contributions and teachings of a past forensic pathologist who made a considerable impact on this field of study.

The presentation will involve four areas: Biography, Mentorship, Research, and Forensic Philosophy.

Biography: This will summarize his career.

Mentorship: This will discuss his role in training forensic pathologists showing both his professional as well as personal side.

Research: This will review his published research summarizing the key findings that may assist in forensic practice. These include research on carbon monoxide, subtle child abuse, therapeutic complications, petechiae, the "empty heart," stress cardiomyopathy, intravenous drug abuse, neuropathology, and bereavement. This review will have a secondary benefit because it also will be educational by sharing results from these studies.

Forensic Philosophy: This will involve a discussion of the certification for a variety of death scenarios as per Hirsch. It will not dictate how these deaths should be certified, per se, but rather will focus on the reasoning behind specific cause and manner certifications.

#### 11.2 Some Insights Into Expanding the Role and Enhancing the Meaning of Academic Forensic Pathology

*M.J. Caplan<sup>1</sup>*

<sup>1</sup>University of Michigan/Michigan Medicine, Ann Arbor, Michigan, USA

Traditionally, the domain of formal education in forensic pathology (FP) has been restricted to FP fellowship training and elective Medical Examiner (ME) rotations for pathology residents and medical students. The author attempted to expose students to FP at earlier stages of their education through two major educational initiatives. The first was an eight-week-long internship in FP for college undergraduates that included a detailed curriculum with well-defined objectives and specific competencies (such as presentation of a case or FP topic of the student's interest to the ME staff). Autopsies provided the core of the daily activities but were enhanced by educational experiences. The workday began with a discussion of the previous day's cases and a decision was made regarding their disposition (i.e., autopsy or external examination). Following the cases and a break for lunch, the didactic session consisted of reviewing the cases (including autopsy findings, history, circumstances of death, and scene findings). If feasible, a cause and manner of death opinion statement was formulated; if not, additional studies to be pursued were identified. Case reviews were followed by synopsis of a forensically relevant anatomic region (such as the anterior neck muscles in a strangulation) and a presentation of a specific topic in FP.

The second program was a two-hour-long monthly forensic pathology career seminar that offered younger (pre-college) students an overview of the ME office and death investigation. Students introduced themselves by revealing their education level, career aspirations, and reasons for attending the seminar. This was followed by a lecture summarizing the death investigation process and the autopsy procedure (external and internal examination). Cause, manner, and mechanism of death were defined and criteria for ME jurisdiction were outlined. Illustrative case examples highlighting the above concepts were given. The seminar ended with a tour of the autopsy room that allowed the students to witness firsthand what they had viewed in the presentation. Students were instructed on how to apply for the internship positions upon entering college.

Both the undergraduate internship experience and the forensic pathology career seminar have been instrumental in exposing students at earlier ages—and at a juncture relevant to their career decisionmaking—to the field of FP. If we are ever to overcome the critical shortage of qualified FPs in the US, we must be willing to be zealous advocates for the profession and create for students a vision of the career path beyond what CSI provides.

#### 11.3 Quality Assurance in Forensic Pathology: The Approaches to Peer Review

*A.W. Walker<sup>1</sup>*

<sup>1</sup>University of Ottawa, Ottawa Hospital General Campus, Canada

The peer review process in forensic pathology has evolved as one of the main quality assurance measures in the practice of forensic pathology. It is employed to detect errors of misinterpretation, omission of relevant findings and failures to pursue relevant ancillary investigations to either confirm or exclude certain differential diagnoses in the performance of postmortem examinations and the preparation of a written medicolegal report on the examination.

There are two pairs of broad options that can be utilized to effect peer review and these are 1) prospective versus retrospective reviews and 2) unblinded versus blinded reviews.

Prospective peer review occurs prior to the issuance of signed finalized

reports to stakeholder agencies and/or relatives before these reports can enter the coronial system, criminal justice system or the civil litigation arena. The overall aim of prospective peer review is to prevent the issuance of flawed reports and the prevention of miscarriages of justice from forensic pathology errors. Prospective peer review is therefore a preventative tool.

In contrast, retrospective peer review is performed sometime after a report has been issued and is rather an audit of the standards of practice and not a preventative tool. Any significant errors identified in a retrospectively reviewed report can be dealt with through immediate notification to the recipient agency and issuance of an amended report.

Unblinded and blinded peer reviews are two subcategories of prospective peer review. In blinded peer review, the draft final report is split into two parts (Parts A and B) and both parts are reviewed by the same reviewer in that order (Part A followed by part B). In Part A, all demographic case data, contextual information and other relevant case identifiers are removed from the draft final report with only the descriptions of the imaging, pathological, biochemical and toxicological findings left in. The Part A component is then assessed for accuracy against the reviewer's review of all the postmortem materials. Once the Part A review has been completed, then the demographic case data and contextual information are then unmasked for the reviewer to facilitate assessment of the conclusions and opinions in the context of the verified postmortem examination findings (Part B review). This two-part process is otherwise known as "linear sequential unmasking." This presentation will provide an overview of the two broad pairs of approaches to peer review which are practiced in three jurisdictions with well-established peer review processes and will compare and contrast the advantages and disadvantages of each approach.

#### 11.4 NAME Member Resources and Analytics

S.C. Clark<sup>1</sup>

<sup>1</sup>Occupational Research and Assessment, Big Rapids, USA

Though the work of various committees and research projects, the National Association of Medical Examiners (NAME) has created, published, and currently maintains multiple data systems (i.e., web-accessible databases) to support the mission of the organization, the individual medicolegal office, and the individual member. Many of the current data systems started as research and development projects to create, validate, and manage the development of several of the NAME professional standards (NAME I&A validation and update, Autopsy Performance Standards, etc.). However, many have grown into interactive systems that support not only NAME standards, but provide educational value specific to many of the occupations represented by the NAME membership.

This presentation will highlight the various NAME-supported systems and the basic analytic tools that may assist members in the advancement of their offices through the application of the NAME standards, and professional growth through information exchange opportunities via many of these systems. The following data systems will be demonstrated:

(1) International Training and Organizations Database (itod.orainc.com): Supporting the ongoing outreach of both the international committee and its organization, this online data system is for individuals seeking information on training programs and organizations hosting opportunities for new and existing professionals in forensics. (2) Inspection and Accreditation Management System (ina.orainc.com): For the NAME office accreditation program from the performance of self-assessments, pre-inspections to the completion of submissions electronically. The system offers basic office analytics on essential office statistics. (3) Online Patient Safety Training Module (taskscope.orainc.com): To support the NAME-created "Patient Safety" course - this system allows individuals to log-in and pre-test, review course materials, read attached materials, and post-test. (4) NAME/SAM Testing Module: Created to maintain Self-Assessment Module (SAM),

completion records for the NAME and its members. (5) Pediatric Toxicology Registry (pedtox.orainc.com): Searchable database may assist NAME members in evaluating child and infant deaths potentially caused by drugs and poisons. (6) NAME Death Registry. The NAME Death Registry (ndr.orainc.com): Searchable database designed to catalog medicolegal death information by specific case-type. The death registry provides general information on cases investigated by medical examiners and coroners nationally.

#### 11.5 Into the Looking Glass: The Creation of Non-Physician Medical Examiners in Wisconsin

J.M. Jentzen<sup>1</sup>

<sup>1</sup>University of Michigan, Ann Arbor, USA

In 1981, after a bitterly contested referendum, Racine County, Wisconsin became the first county in the United States to appoint a nonphysician to the position of medical examiner. The Wisconsin attorney general had previously ruled in an administrative code that "the office of medical examiner should be occupied by an expert [in the field of medicine] but not necessarily a physician." A review by the Wisconsin Court of Appeals upheld the Racine County Ordinance allowing appointment of nonphysician medical examiners. In 1986, Milwaukee County, the largest county in the state, attempted to appoint a nonphysician district attorney administrator as medical examiner; the measure was eventually overturned by the county medical society and a forensic pathologist was hired for the position.

By 2002, there were 16 nonphysician medical examiners appointed in Wisconsin. The numbers continued to grow so that by 2020 there were 31 nonphysician medical examiners serving in 72 Wisconsin counties. Over half of the nonphysician medical examiners in 2020 and many with nursing and other advanced degrees. The action had the effect of endorsing a coroner-like system by replacing many physician-coroners under the veil of nonphysician medical examiners, who retained all of the powers of traditional physician medical examiners.

Confronted with growing funding challenges and shortages of forensic pathologists, local governments seek alternatives to highly paid forensic experts. Increasing numbers of pathologist assistants, social workers, and other healthcare technicians continue to be attracted to the medicolegal system. These healthcare workers assume the scene investigation, autopsy dissection, and administrative duties surrendered by forensic pathologists, expanding their own professional aspirations. In the future, similar to other healthcare professions, medical examiner systems under the direction of trained forensic pathologist may become a relic of the past.

#### 11.6 Here Today, There Tomorrow

A. Denmark<sup>1</sup>, K. Looman<sup>2</sup>

<sup>1</sup>SmithGroup, Phoenix, Arizona, USA; <sup>2</sup>Hamilton County Coroners Office, Blue Ash, Ohio, USA

In 2021, the Hamilton County Coroner completed a move from their home of the past 50 years adjacent to the University of Cincinnati's campus to a new facility located 12 miles away in the city of Blue Ash, Ohio. This move was the culmination of a decade long effort to uncover deficiencies of the existing facility, delineate the organization's need (which includes the County crime lab), acquire a site, and design and construct the new, 83,000 square foot facility. After completion, the process of migrating operations to the new facility was able to begin in earnest. Once operations were up and running in the new location, the process of understanding how to optimize operations with a facility that provided new opportunities for workflow, imaging, and processes has begun.

This presentation will take an in-depth look at the process of developing a new facility, the challenges of moving operations, an overview of learning to use a new space, and the impacts of new imaging modalities. Taken individually, each of these steps represent a daunting obstacle that must be overcome to improve staff conditions and operational outcomes. The goal of the presentation is to illuminate important issues at each step along the journey and showcase the benefits that updated facilities and technologies can provide.

#### **12.1 A Novel Approach to Customer Service Management at the Office of the Medical Examiner: The Role of the Family Advocate**

*B. Eutenier<sup>1</sup>, I. Cortes<sup>1</sup>, A. Rex<sup>1</sup>*

*<sup>1</sup>Maricopa County Office of the Medical Examiner, Phoenix, Arizona, USA*

In 2017, the Maricopa County Office of the Medical Examiner (MCOME) saw the need to improve its Customer Service Management program with the goals of reducing response times for inquiries, improving efficiency and effectiveness of communications to families, decreasing stress amongst Investigative and Medical Examiner staff, and alleviating escalation of complaints through use of a consistent approach focused on customer service. Customer interactions were stratified from standard inquiry to escalated complaint and a tracking system developed to improve response times. A new position, the Family Advocate, was developed to serve as the primary point of contact between family members and/or their representatives and the MCOME. The Family Advocate position requires a degree in Social Work, Counseling, Family Studies, Psychology, or Criminal Justice with experience in victim advocacy, social work, crisis intervention and/or another closely related field.

Family members and their representatives in their time of grief are often unsure about next steps and unclear on what resources may be available to them for emotional and financial support. Providing a dedicated resource to these customers helps them move through the grieving process, allows them to be heard in their time of grief, and addresses inquiries and concerns before they escalate. This single point of contact can greatly impact a customer's perception of the Office of the Medical Examiner, the dedication and hard work of its staff, and the medicolegal death investigation field as a whole. This also aids other MCOME staff by providing them with a staff member who is uniquely trained and equipped to provide assistance to families in an empathetic and supportive manner. The Family Advocate position additionally allows MCOME to convey accurate and consistent messaging to all customers, correct misconceptions of MCOME's roles and responsibilities, and manage expectations regarding time to case completion and availability of reports through proactive communication. This presentation will highlight the features and benefits of the Family Advocate role, our customer service management process, and the improvements seen in response times and complaint management since the addition of this unique and important role.

#### **12.2 Appeals of Manner and Cause of Death in Maryland**

*B. Goldfarb<sup>1</sup>, V.W. Weedn<sup>1</sup>*

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A state law in Maryland allows family members to contest cause and death determinations of medical examiners. A previous paper described the law and the experiences of Maryland's Office of the Chief Medical Examiner with 12 instances of appeals during a three-year period. This paper presents an update on the statutory language and a series of 11 cases of appeals that occurred between 2015 and 2020.

#### **12.4 Medical Examiner/Coroner (ME/C) Case Management System Projects: A Process Review from Procurement to Implementation in Three Medical Examiner Offices Over a 10-year period**

*K. Cline-Parhamovich<sup>1</sup>*

*<sup>1</sup>Pierce County Medical Examiner's Office, Tacoma, Washington, USA*

The modernization of medical examiner/coroner (ME/C) case management and data collection has the potential to streamline daily operations while improving the provision of mortality data to stakeholders. Currently, the adoption of technology in ME/C offices is highly variable, ranging from paper-based ledgers to electronic case management systems (CMS) with interfaces between laboratories and electronic death registration systems. A commonality of the process is limited time, funding, and staff required for such a project.

As more ME/C offices consider replacing or updating their case management systems, the higher the need for forensic pathologists and ME/C staff to gain a basic understanding. Those without the inclination, training, or experience in technology may find themselves in a position to lead or participate in a CMS project; those who are technically inclined may be unfamiliar with administrative processes. An overview of both the technological and administrative sides of the process can bridge some knowledge gaps and serve as the starting point that enables an ME/C office to better prepare for and advocate for the necessary resources (human and fiscal) required for the project.

A high-level overview of three separate medical examiner CMS projects of varying levels of complexity will be presented in a nontechnical manner. The projects involve three ME offices that differ in catchment area, organization (county/regional/statewide) and project complexity, which occurred over a combined period of roughly 10 years. The intent is to provide a basic understanding of what to expect when expecting a case management system and demystify the process.

#### **12.5 Results of the Automation of the Tissue Donor Referral Process in an Urban Medical Examiner's Office**

*C.J. Schmidt<sup>1</sup>, S. Sommer<sup>2</sup>, C. Sanders<sup>2</sup>, A. Samuels<sup>3</sup>, L. Sung<sup>3</sup>*

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Referrals for tissue donation in a high volume medical examiner's office is a challenge for deaths that occur outside hospitals. Information that tissue procurement organizations need, such as time of death, or when last seen alive, are often unknown or uncertain. Finding next-of-kin (NOK) in a timely fashion is another problem, as well as what funeral home the body will be going to if it is released on site. Investigators, who may be busy, may not remember to refer a death, and even checklists require updating if not all the information is present when a case is called in. The Wayne County Medical Examiner (WCME) handles 15,000 to 16,000 death reports a year, of which about 3,800 are seen by the ME. There were not more than seven to eight referrals a month in out-of-hospital deaths, sometimes none at all, and not more than three or four actual tissue donations. A way to improve referrals without interrupting WCME workflow was needed.

The solution was to automate the referral process. A software module was installed by the vendor for our case management system that would push information in certain database fields to the tissue procurement organization (TPO) – Gift of Life Michigan. Aside from the usual demographic data and case identifiers, fields such as "Pronounced Date" and "Pronounced Time", information related to when the deceased was last seen alive and for finding next of kin is prioritized, since these determine the time period available for tissue donation. Since not all pertinent information is available immediately, items like clinical history are pushed

to the TPO as a separate note when it becomes available. A time lag is built into the system to report the case to the TPO that is currently 120 minutes. This allows time for the fields that are designated to push to the TPO, to have more data populated, and NOK information to be obtained. The TPO does not contact the family unless next of kin are notified.

Results were apparent immediately. The software was implemented in mid-September 2020, and that month had 159 referrals. There are about 525 referrals a month since then, with about nine donors per month. This year, from 1/1 to 4/30, there have been 2152 referrals and 36 donors. This will increase as more experience is gained with gathering information on released out of hospital cases.

## 12.6 Medicolegal Death Investigation, Virtually Ignored No More

*K. Keyes<sup>1</sup>, J. Roper-Miller<sup>1</sup>, D. Slack<sup>1</sup>, J. Rineer<sup>1</sup>, H. Smiley-McDonald<sup>1</sup>*

<sup>1</sup>RTI International, Research Triangle Park, North Carolina, USA

Many Medical Examiner/Coroner (ME/C) offices would be the first to note that budgetary restrictions are a top concern in the field, so any additional no cost resources to an MEC office and their staffs is beneficial. RTI International has many resources developed for medicolegal death investigation, some are even available for ABMDI credits. The participant in this session will learn about efforts being undertaken at the federal level to strengthen the MDI systems and to recognize the valuable service and plentitude of insightful data that is collected during an investigation.

Some of the resources provided by RTI through various federal partnerships include the opioid training for Forensic Pathologists and Medicolegal Death Investigators that NAME and RTI partnered on and is available through the RTI website for ABMDI credits. RTI maintains the Forensic Technology Center of Excellence (FTCOE) which regularly offers Just Science Podcasts, live events, and archived webinars on topics such as vicarious trauma, rapid DNA, postmortem CT and detection of bruising using ALS. Similarly, information on developing an overdose fatality team (OFT) and resources for OFT's to use to best serve their communities are available. RTI recently completed the Census of Medical Examiner and Coroner Offices on behalf of the Bureau of Justice Statistics, and the National Institute of Justice research survey on work-related stress of medicolegal death investigators. RTI is involved in efforts to make sharing of data easier for MDI offices, and has recently worked on some research related to outsourcing and how that can augment an MDI office. RTI manages the National Forensic Laboratory Information System (NFLIS) for the Drug Enforcement Administration, which now contains an ME/C data collection that includes all deaths in which any drug was identified, and is availing NFLIS resources to all new ME/C partners. Earlier this year, RTI was awarded the contract to manage the National Missing and Unidentified Persons System (NamUs). RTI will lead a consortium of forensic testing service providers, experts, and practitioners to facilitate the resolution of missing and unidentified persons cases nationwide. All these resources can be particularly useful to the MDI community to stay abreast of new research and offer training and resources to yourselves and your colleagues.

## 12.7 Courtroom Testimony Training Through the Lens of a Director

*F. Henry<sup>1</sup>*

<sup>1</sup>Saint Lucia Forensic Science Laboratory, Castries, Saint Lucia

Who wants to be an expert witness? Those of us trained in the various specialties of forensic science are assigned this role by default, but are we really ready? Are we ready to play our part in the theatre of the courtroom? Because that is just what it is—a world completely different from the scientific world we are so comfortable in and accustomed to—an isolated world where scientific literature rules the day and we can easily find

'evidence' to corroborate or refute a scientific theory. However, in the courtroom, it is a battle of the minds, a battle of words. Who is the most articulate? Who is able to dissect procedure and quality in a manner that is easily understood, so that the trier of fact can get a glimpse of what transpired in the laboratory or the autopsy suite?

We are carefully and expertly trained in procedure and execute it to best quality practice. We are certain we did our work the right way and without bias. Yet, when we are confronted by a learned defense attorney or the mere thought of having to testify under oath, in a court of law, we become petrified. Courtroom testimony training then becomes the key to remaining calm and composed under immense pressure.

Generally, medical undergraduate medical students, interns and post-internal doctors receive no courtroom testimony training. Undergraduate or graduate forensics students sometimes get an opportunity to practice with a case and an associated mock trial that is well executed in a real courtroom with a sitting Judge or Magistrate and the assistance of law students as attorneys but the theoretical training component is lacking. Unfortunately, courtroom testimony training is by far the exception instead of the norm. In the real world, most forensic experts are unprepared and seldom have pre-trial conferences with the prosecution. The anxiety and mental anguish run so high that the most intelligent medical or forensic professional can appear incompetent and unprepared, especially by aggressive lawyers.

The expert must be armed, through appropriate training, to recognize the tactics commonly employed by defense attorneys in order to be ready to respond. This presentation seeks to share the Caribbean experience of Courtroom Testimony Training. It will also highlight how we adapted to a virtual mode of training due to the constraints of the COVID 19 pandemic.

## POSTER PRESENTATIONS

### P1 Possible SARS-CoV-2-Induced Lymphocytic Myocarditis in a One-Year-Old

*R. Mahabir<sup>1</sup>, C. Bockoven<sup>1</sup>, M. Alturkustani<sup>1</sup>, L. Szymanski<sup>1</sup>*

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Viral myocarditis is the most common cause of inflammatory cardiomyopathy in the pediatric population. Common etiological agents include viruses (adeno-, entero-, herpes-, coxsackie-, influenza), bacteria, mycobacteria, fungi, protozoa, and parasites. Myocarditis due to SARS-CoV-2 has been reported in adult cases, with the pathophysiology due to a combination of direct viral injury and cardiac damage due to the host immune response. In children, SARS-CoV-2 related myocarditis has been reported with Kawasaki syndrome-like features (fever, cheilitis, rash, lymphadenopathy) but without the coronary artery dissection. Sudden death in the pediatric population is commonly associated with myocarditis and may be the presenting feature with definitive diagnosis made during postmortem examination. Here, we represent a case of a previously healthy one-year-old girl who presented with tachycardia with suspected acute, fulminant myocarditis and no further symptoms indicative of Multisystem Inflammatory Syndrome of Children (MIS-C) or Kawasaki syndrome. Viral studies were positive for SARS-CoV-2 IgG serology; which was negative by PCR, and PCR positive EBV and parvovirus. The hospital course was complicated by severe left ventricular dysfunction with an ejection fraction of 27% and multiple cardiopulmonary arrests. She had a precipitous course and developed poor neurological function with seizures and was ultimately declared brain dead. At autopsy there was 30 mL of hemopericardium; with no definitive myocardial rupture, cardiomegaly with dilated right atrium and patchy myocardial pallor of the left ventricle. Cardiac dysfunction led to visceral congestion, hepatosplenomegaly and numerous effusions including bilateral pleural effusions and ascites. The remainder of the autopsy was noncontributory to the cause of death. Microscopic

examination of the heart showed extensive amounts of granulation tissue and fibrosis involving the epicardium, myocardium and endocardium and diffuse, multifocal infiltration of lymphocyte and macrophage predominant inflammation. Viral stain (EBV, SARS-CoV-2) and electron microscopic imaging for viral particles were negative. Skeletal muscles had extensive myonecrosis with associated regeneration and the brain had severe cerebral edema with diffuse acute hypoxic ischemic encephalopathy. The histologic examination showed no signs of MIS-C; increased inflammation. This case suggests that SARS-CoV-2 sequelae may cause myocarditis as illustrated by positive serology and histologic findings consistent with subacute/chronic myocarditis. This case was complicated by positive EBV and parvovirus PCR, both viruses which are known to cause myocarditis in the pediatric population and thus, a definitive cause of myocarditis could not be rendered. In pediatric cases with positive SARS-CoV-2 serology, a careful examination of heart is recommended to exclude lymphocytic myocarditis.

### **P2 Systemic EBV-Positive T-Cell Lymphoma of Childhood Causing Cardiac Myocarditis with Necrosis and Vasculitis**

R. Mahabir<sup>1</sup>, C. Bockoven<sup>1</sup>, M. Alturkustani<sup>1</sup>, L. Szymanski<sup>1</sup>  
<sup>1</sup>Children's Hospital Los Angeles, Los Angeles, California, USA;

Systemic Epstein Barr Virus (EBV)-positive T-cell lymphoma of childhood is a rare, aggressive rapidly progressive disease most often seen in African-American and Hispanic children. It is due to the proliferation of activated, monoclonal EBV-positive cytotoxic T-cells. Here, we present the case of a previously healthy four-year-old girl who had initial complaints of right facial swelling and tooth discomfort who progressed to develop bleeding and seizure activity. Extensive workup showed lymphocytosis, non-neutropenia and bacteremia. She was diagnosed with systemic EBV T-cell lymphoma of childhood involving the cervical lymph nodes, liver and bone marrow. She began induction chemotherapy, but continued to decompensate and was hospitalized. While hospitalized, she had a precipitous course with worsening respiratory status, increased work of breathing, increased abdominal distention, hemorrhage from dental extraction sites and cerebral edema with multifocal hemorrhages. At autopsy, she had jaundice and multiple red petechiae and purpura of the trunk and extremities. On internal examination, there were multiple punctate white nodules in the myocardium, multifocal lesions in the kidney, and an area of hemorrhage within the left upper quadrant, encasing the spleen and bowels as well as diffuse fat necrosis and hepatosplenomegaly. The brain was edematous with a large left cerebral hemorrhage and associated intraventricular hemorrhage. Notably, microscopically the heart showed numerous caseating necrotizing granulomas with coronary artery vasculitis concerning for tuberculous myocarditis particularly due to the decedent's history of immunosuppression. Gram, Fite and GMS stains were negative for bacteria, fungus, and atypical mycobacteria. AFB stain highlighted one possible acid-positive bacillus; AFB sequencing was negative with no nontuberculous mycobacteria or mycobacterium tuberculosis detected. Granulomas and vasculitis were also noted in the kidney, vessels in the abdomen and spleen causing the abdominal hemorrhage and splenic infarcts, and within the brain. These areas of vasculitis and necrosis had an extensive monomorphic infiltrate of small lymphocytes with minimally irregular nuclear contours and scant cytoplasm which stained strongly for EBV. In summary, the necrotizing granulomas seen in the heart were angiodestructive vasculitis and vasculocentric necrosis that can be seen EBV associated lesions, particularly Systemic Epstein Barr Virus (EBV)-positive T-cell lymphoma of childhood. We present this case to highlight this rare cause of death in the pediatric population and to demonstrate that not all necrotizing granulomas are related to Mycobacterium. Here we show that EBV associated lesions can be a cause of myocarditis due to vasculitis and vasculocentric necrosis, in these cases EBV should be considered as a causative factor.

### **P3 Virtual Pre-Autopsy Organ Recovery and Review**

D.M. Jackson<sup>1</sup>  
<sup>1</sup>Southwest Transplant Alliance, Dallas, USA

Purpose: If we build quality relationships, then it is possible to have positive & successful outcomes; seeking every interaction as an opportunity to learn and grow. What if you were able to visualize an organ recovery in Midland, Tx. from your office in Fort Worth, Tx?

Methods: This accomplishment began by creating a role of "Medical Examiner/ Justice of the Peace Liaison". We are proposing that treating people like they matter is the foundation. Building trust, having respect, being mindful of others time and responsibility, welcoming the differences of opinion, and most of all, open communication. Meeting in person has been the most receptive tool and allows for conversations that normally would be dismissed over the phone. Finding the mode, manner, and circumstances of death is just as important as saving lives.

Results: The findings were extremely noticeable. We were able to get feedback from our partners and have real conversations face to face which in turn allowed us to accept some misinterpretations along with mistakes made. When we owned them and made plans for corrective action/performance improvement, it changed the relationship. It strengthened it. We have seen where trust is the foundation for growth.

Conclusions: As we are able to share the impact of donation through the organ, eye & tissue authorization granted by our partners we are able to explore some new concepts. Being a visionary has great responsibility. I can share with you that utilizing virtual reality will be the next step in our quest to maximize the gift. As we have our own facility that is able to be the hub for excellence through proper, training, education & research.

Note: Is there a better way to provide a real time look into the donor process?

1. To alleviate excess phone calls to someone on the other line what you are seeing in the O.R.?
2. To verify the integrity of the organs in-situ
3. To visualize integrity of the patient's body
4. Able to escalate through proper channels with on call responsibilities (Administrator on-call, Medical Examiner's)

### **P4 When Medication Kills: Antimalarial-Induced Cardiomyopathy**

B. Flynn<sup>1</sup>  
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Chloroquine and its derivative, hydroxychloroquine, are antimalarial medications that have commonly been used for decades in the treatment of rheumatologic diseases such as rheumatoid arthritis and systemic lupus erythematosus. While the exact mechanisms of action of these medications are unclear, their immunomodulatory effects are thought to be due to increasing pH within intracellular vacuoles resulting in lysosomal dysfunction. Recently, these medications have received much attention due to their utilization in the treatment of SARS-CoV-2 infection.

Although side effects such as retinopathy are relatively common, recent interest in the safety profile of chloroquine and hydroxychloroquine has led to increasing recognition of cardiac toxicity, which was once thought to be an exceedingly rare complication. Cardiac toxicity is a potentially lethal side effect classically seen in a chronic setting in correlation with the cumulative dose and duration of medication use, although acute toxicity is also described. Cardiotoxic side effects include heart failure with biventricular hypertrophy, restrictive cardiomyopathy, and conduction disturbances including QT prolongation, *torsade de pointes*, and ventricular tachycardia. Antimalarial-induced cardiomyopathy (AMIC) is an important entity to be

aware of in both the premortem and postmortem setting, as it may be reversible with discontinuation of the drug, but may otherwise be associated with significant mortality.

Reported here is a case of a 51-year-old woman with mixed connective tissue disease and a twelve-year history of hydroxychloroquine and subsequent chloroquine use who experienced acute congestive heart failure. She presented in cardiogenic shock, rapidly declined, and died. An autopsy limited to examination of the heart, including gross, histologic, and electron microscopic examination, revealed the cause of death to be antimalarial-induced cardiomyopathy. The classic macroscopic, histologic, and ultrastructural findings of AMIC found at autopsy are presented and current literature surrounding AMIC and cardiac toxicity is discussed.

#### **P5 Retrograde Type A Aortic Dissection Masquerading as a Large Unilateral Pulmonary Embolism: A Lesson on Confirming Abnormal Ventilation/Perfusion Scans**

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Acute aortic dissection is a life-threatening complication that may cause sudden death through a variety of mechanisms, the most common being cardiac tamponade. A very rare and unusual clinical presentation may occur when the dissection ruptures into the aortopulmonary window, allowing extravasated blood to dissect along the pulmonary artery.

Case report: A 58-year-old male with a history of hypertension controlled on medications presented with acute dyspnea, pleuritic mid-chest pain, severe epigastric pain, and an intermittent cough. On exam, he was tachypneic, tachycardic, hypertensive, and hypoxicemic. Significant labs included D-dimer >500 ng/ml and a doubling of creatinine within 8 hours of admission. After initial concern for a pulmonary embolism (PE) and potential SARs-CoV-2 infection, a portable V/Q scan was obtained with the patient on isolation. V/Q scan showed absent right lung perfusion and he was treated for a presumed PE. Confirmation with CT pulmonary angiography was deferred due to acute renal injury and COVID-19 isolation status. Fifty-five hours after admission his respiratory status worsened and he was ultimately intubated, at which point he suffered cardiac arrest and was unable to be resuscitated. A regional postmortem examination demonstrated a hemopericardium and an intimal tear in the right lateral wall of the ascending aorta with rupture through the tunica media and subsequent subadventitial dissection in a retro- and anterograde fashion. The subadventitial dissection extended into the posterior aspect of the main pulmonary artery (mPA) and further involved the left and right pulmonary arteries (RPA), preferentially affecting the RPA with significant luminal compression by a dissecting hematoma—accounting for a clinical picture of a large unilateral PE. Death was due to rupture of the dissection into the pericardium causing cardiac tamponade during intubation.

Discussion: The mechanism for this extremely rare and peculiar presentation is made possible by the anatomical relationship of the mPA and aorta: a common adventitial layer is shared at the roots of these vessels. A subadventitial dissection of the aorta may allow for a dissecting hematoma to extend into the mPA, and either result in luminal compression or rupture causing mediastinal or pulmonary hemorrhage. This case serves to highlight the importance of the postmortem examination in confirmation of disease processes and quality improvement of patient care.

#### **P6 The Role of the Forensic Pathologist in Aviation Deaths**

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Introduction: The forensic pathologist plays a central role in the investigation of aviation crashes. The investigation is multifaceted and varies based on the circumstances of the collision. First and foremost is identification of the victims and documentation and preservation of evidence. Identification of the decedents and their location in the aircraft is paramount and is based on dental records, fingerprints, tattoos/markings, and DNA analysis.

Secondary to identification is the role of the medical examiner to determine the cause of the crash, if possible. Patterns of injury to victims are analyzed in an attempt to reconstruct the events surrounding the crash. While there are no pathognomonic injuries that can readily identify the pilot, control surface injuries of the upper and lower extremities, seen grossly or via x-rays, can aid with the determination of victims' positions in the aircraft. Other injury patterns such as restraint belt injuries, impacts with aircraft structures, and thermal injuries can also be beneficial. Toxicology analysis and documentation of natural disease in the pilot assists in determining the cause of the crash.

Methods: In order to illustrate the medical examiner's role in aviation crashes, we analyzed a case from 2019 of a small aircraft crash shortly after takeoff leading to the death of the two passengers on board. It was unclear at that time who was piloting the aircraft and what caused the crash.

Results: Identification of the decedents revealed two male passengers in their sixties, both found in the front row of seats within the aircraft. Scene inspection demonstrated one of the passengers with his hands still on the controls and a 5 cm laceration of the right forearm, identifying him as the presumed pilot. X-rays of the hands and feet did not reveal any other surface control injuries. Toxicology from both passengers was sent to the FAA and resulted as negative for drugs or alcohol. Medical autopsy revealed multiple traumatic internal injuries, most notable being that both passengers sustained proximal aortic lacerations with associated hemothorax. Also of note, autopsy of the suspected pilot of the aircraft revealed high grade atherosclerosis and a recent thrombus in the right coronary artery.

Conclusions: The medical examiner plays a vital role in aviation crashes by using scene investigation, body identification, injury pattern analysis, and toxicology, and ultimately aids in the determination of the cause of the crash.

#### **P7 Abdominal Apoplexy Associated with Vascular Ehlers Danlos Syndrome (Type IV): Two Fatal Cases**

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Abdominal apoplexy or idiopathic spontaneous intraperitoneal Hemorrhage (ISIH) refers to an exceedingly rare type of catastrophic intra-abdominal hemorrhage arising from a small artery or vein. Excluded, by definition, is hemorrhage due to trauma, a ruptured aortic aneurysm or dissection, bleeding from gynecologic conditions such as ectopic pregnancy, and bleeding associated with visceral malignancies.

The underlying etiology for the vascular dissection or rupture is often elusive and proposed causes include atherosclerosis, hypertensive vasculopathy, fibromuscular dysplasia, idiopathic, autoimmune, and infectious vasculitis, as well as heritable connective tissue disorders, such as the Marfan and Ehlers-Danlos syndromes.

These suggested connective tissue disorders carry additional risks for operative management, as attempts at vascular repair may be almost impossible due to tissue fragility. However, nonoperative mortality approaches 100%. Therefore, successful management of this condition requires a high degree of clinical suspicion and timely surgical laparotomy. An investigative approach to identify the cause of ISH should always be executed in order to direct further management, if the patient survives, and to provide appropriate genetic counseling for family members who may also be at risk.

Here, we present two fatal cases of abdominal apoplexy with confirmed vascular-type Ehlers Danlos syndrome, accurately diagnosed by postmortem targeted next-generation sequencing.

#### **P8 Postmortem Molecular Testing: A Case Report on Genetic Diagnosis Based on Autopsy Findings**

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A 38-year-old male with history of remote viral myocarditis and treated cutaneous varicella zoster presented with abdominal pain, severe hypertension, and acute heart failure. Coronary catheterization was normal. Imaging revealed a large (7.2 cm) mass in the left upper quadrant. Despite maximal support, the patient developed cardiogenic shock with progressive multiorgan failure. He was transitioned to comfort care and died within 48 hours of admission. Autopsy demonstrated a solid and cystic hemorrhagic mass of the left adrenal gland. On microscopy, there were sheets of neoplastic cells with enlarged/geometric nuclei with chromogranin and synaptophysin immunoreactivity with sustentacular cells highlighted by S100. Those findings were consistent with pheochromocytoma. The heart demonstrated bilateral ventricular enlargement with foci of contraction band necrosis and cardiomyocyte dropout. No evidence of active myocarditis was identified. Other systemic findings included hepatic hypoperfusion injury, features of acute tubular injury, pulmonary edema, and small acute hemorrhagic cerebellar infarct. No discrete lesions of the thyroid/parathyroid, pancreas, or pituitary were identified. The cause of death was attributed to multisystem organ failure due to cardiogenic shock due to catecholamine-induced cardiomyopathy due to pheochromocytoma. Further discussion of the pathologist with the family revealed that the patient had six living children and two children that had passed away (daughter, age 15, died of unspecified cancer; infant, died of unknown causes), raising concern for heritable conditions.

After obtaining consent, next generation sequencing (NGS) was performed on postmortem neoplastic adrenal tissue and non-neoplastic tissue (blood). A clinically validated next generation sequencing panel that assesses mutations in 362 genes related to cancer treatment/prognosis/diagnosis (UW-Oncoplex) revealed clinically significant germline variants in the RET (p.K666N, VAF=0.46) and p53 (p.R273H, VAF=0.48) genes. Referral for disclosure of results and expert genetic counseling was given to the family. Pheochromocytomas are neuroendocrine neoplasms derived from chromaffin cells, often arising from the adrenal medulla. They produce catecholamines which can result in hypertension, episodic headache, and tachycardia. Pheochromocytomas can be asymptomatic/variably symptomatic due to intermittent release. There are numerous genetic mutations associated with pheochromocytoma (e.g., VHL, RET, NF1) and these genetic mutations can be inherited (germline) or sporadic (somatic). Inherited mutations are more often seen at younger age (<40 years old) and can be associated with various genetic syndromes. This case demonstrates an autopsy diagnosis of pheochromocytoma in a young patient with two children that passed away, and with postmortem molecular testing that

revealed germline RET and TP53 mutations with potential impact for living family members.

#### **P9 A Case Report of Disseminated Congenital Cytomegalovirus Infection**

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Cytomegalovirus (CMV), an enveloped DNA virus, is a common infectious disease in all ages. It can result in intrauterine transmission to a fetus during pregnancy from a woman with primary or nonprimary CMV infection. In an immunocompetent host, CMV can cause mild symptomatic disease, whereas it can lead to a serious illness in an immunocompromised individual. Similarly, congenital CMV infection can be asymptomatic or develop more complicated sequelae from sensorineural hearing loss to fetal demise.

In our case, a 28-year-old pregnant woman at 26 weeks of gestation was admitted to an outside hospital following trauma to the abdomen, reportedly being hit in the abdomen by her two-year-old son's fists. Following a nonreassuring fetal heart rate, an urgent Caesarian section delivery was performed. At 33 hours of age, the medical support was discontinued due to severe hydrocephalus and brain anomaly. Owing to the nature of the initial presentation with maternal abdominal trauma, a subsequent medicolegal autopsy was performed. Autopsy revealed disseminated CMV infection involving the placenta, brain, kidney, liver, thymus, pancreas, and spleen. No evidence of trauma was found.

This case illustrates the importance of a comprehensive investigation, examination, and histological studies of medicolegal autopsies in determining the cause and manner of death.

#### **P10 Postmortem Computed Tomography Findings in Scuba Deaths Due to Arterial Gas Embolism**

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Introduction: Postmortem computed tomography (CT) can be an invaluable tool in diagnosing arterial gas embolism in the setting of scuba diving deaths. Limited available guidelines recommend that postmortem imaging occur within eight hours of death to limit confounding postmortem gas artifacts, such as decompression ("off-gassing") and decomposition. Logistical challenges of coordinating scene investigations, body transport, postmortem imaging, and autopsy limit the ability to perform imaging studies within the recommended timeframe. This case series explores whether CT imaging performed with postmortem intervals greater than 20 hours can still provide insight and findings to support or exclude diagnoses of arterial gas embolism.

Methods: A retrospective study of scuba-related deaths with CT and autopsy performed at the Los Angeles County Medical Examiner-Coroner between 2016-2020 was conducted. The medical examiner investigator narrative reports were reviewed for historical information and CT images were reviewed for subcutaneous emphysema of the chest, gas in the left ventricle and supraaortic trunk extending to the basilar artery, gas in the liver, and decompression gas in cerebral veins. Subjects were divided into two groups: deaths due to arterial gas embolism and deaths due to other causes.

Results: Nine cases fit the inclusion criteria with two in the arterial gas embolism group and seven in other deaths. Computed tomography scans were performed an average of 49.7 hours (range 18-89) after time of death.

A history of rapid ascent from depth was reported in two arterial gas embolism deaths (100%) and in two of the other deaths (29%). Subcutaneous emphysema of the chest and pneumatization of the left ventricle, aortic trunk, carotid arteries, and basilar artery were noted in both arterial gas embolism deaths (100%) and four of the other deaths (57%). Evidence of decompression gas was present in both arterial gas embolism deaths and three of the other deaths (43%). Gas in the liver was noted in all cases.

Discussion: This study demonstrates that although nonspecific in the setting of prolonged postmortem interval to time of CT imaging, subcutaneous emphysema and gas in the left ventricle and supraaortic trunk can be demonstrated in deaths due to arterial gas embolism. In addition, while varying degrees of decomposition gas in the liver were noted in all cases, decompression or off-gassing was not always present. Thus, despite prolonged postmortem intervals to imaging, CT findings can be used to rule out arterial gas embolism, particularly in cases with reported histories of rapid ascent.

#### **P11 Death Due to Accidental Crossbow Arrow Injury: A Case Report and Review of the Literature**

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Accidental deaths due to crossbow injuries are rarely encountered in forensic practice. Crossbows are weapons that shoot arrow-like projectiles using an elastic launching mechanism activated by a gun-like trigger. They are commonly used for recreational activities such as hunting and sports. The manner of death is typically suicide or accident, while homicides are rare. Here, we describe an autopsy case of a 40-year-old white male found dead in the woods who, according to investigations was hunting alone. A penetrating wound to the upper torso was observed with a slit-like defect on each layer of his clothing. A partially broken arrow was seen inside the wound. A blood-stained crossbow with the safety features off was found on the scene, and a nearby partly bent arrow with a broken tip. At autopsy, a penetrating upward-sloping wound on the left torso was evident, which lacerated in its way the subclavian vessels. The cause of death was determined to be severe bleeding due to the penetrating wound. Toxicological analyses of blood showed methamphetamines and metabolites of cocaine. The analysis of the scene, the victim's clothing, wound features, and toxicological findings led to the determination of the manner of death as accidental. In crossbow-related deaths, particularly when the arrow is removed from the wound, determining the weapon used proves challenging due to the similarity of the resulting wounds to the wounds of other weapons. Thus, knowing the crossbow features, the wound patterns, and the weapon's mechanism helps in determining the proper cause and manner of death. This reported case of an uncommon accidental death due to a crossbow arrow aims to increase the knowledge about this type of death, by educating forensic pathologists about the features of crossbow deaths. It also emphasizes the importance of integrating critical crime scene investigation and autopsy findings to reach a correct manner of death.

#### **P12 Death by choroid plexus tumor infarction: a rare entity**

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Choroid plexus tumors are a rare entity. These neuroectodermal neoplasms are derived from the choroid plexus epithelium and occur within the ventricular system of the brain. They account for less than one percent of all intracranial tumors and 2-4% of brain tumors in children. In adults, they most commonly arise from the fourth ventricle, and in children, from the lateral ventricle. These tumors are usually incidental findings unless they present with significant symptoms. Below, we describe a case encountered in our office.

A 14-year-old otherwise healthy female developed sudden onset headache, eye strain, and emesis, which was treated with over-the-counter medication. She was found unresponsive by her mother several hours later and was declared dead at the hospital.

On postmortem examination, there was diffuse cerebral edema and minimal subdural hemorrhage in the posterior cranial fossa. There was also subarachnoid hemorrhage of the anterior brainstem and inferior cerebellum, with intact arteries at the base of the brain. Sectioning of the brain demonstrated intraventricular hemorrhage throughout the ventricular system and dilatation of the cerebral aqueduct. There was discoloration, softening, and necrosis of the bilateral cerebellar hemispheres and necrosis of the right cerebellar tonsil.

Microscopic sections of cerebellum demonstrated infarcted papillary fibrovascular cores with numerous surrounding foamy macrophages. Sections of clot also demonstrated large fragments of infarcted fibrovascular cores and strips of epithelium. Additionally, there was microscopic evidence of recent and remote hemorrhage within the cerebellar deep white matter. These findings were consistent with an infarcted choroid plexus papilloma.

Sudden death in relation to a choroid plexus papilloma, though uncommon, is typically due to acute ventricular obstruction or subarachnoid hemorrhage. Though these tumors are rare, they should always be considered in the differential of acute collapse in an otherwise stable individual.

#### **P13 Improving Accuracy of Overdose Death Reporting**

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As drug overdose deaths persist across the United States, the importance of accurate reporting continues to increase. Actual death enumeration, in addition to precise identification of drugs contributing to death are critical factors in appropriately addressing this public health issue. However, in many jurisdictions, hospitals have inadequate protocols in place to capture the necessary information required to provide helpful data for use in monitoring trends in communities affected by the overdose crisis.

Our team gathered data from the state health department, first looking into death certificates signed by physicians at the academic tertiary hospital, or a medical history of recent treatment at that hospital. Further criteria to review certificates included having a cause of death listed as a drug overdose (likely, possible, or probable were also included) and manner of death listed as accident. From this point, we investigated cases for which there was no causative agent listed. Death certificates signed between January 2015 and December 2020 were reviewed. The certificates that aligned with these criteria represent a population of cases with incomplete death certificate information. This missing information would otherwise inform the department of health, family, and authorities of potential trends and toxic agents that are prevalent in a given community. Using this data, we approached the core clinical lab of our tertiary academic hospital to request permission to store two grey top (sodium fluoride) tubes for all patients presenting to the emergency department with suspicion of acute

drug toxicity. With their cooperation, we also approached the emergency department of our institution to create a protocol in which all unresponsive, unknown, even marginally suspected intoxicated patients have peripheral blood drawn into these grey top tubes, sent to our core lab, and remain available for drug screening or testing at a reference lab for seven days post discharge if the patient dies within this timespan.

With these additions implemented, it is our hope to provide additional information, including causative agents and quantities, involved in drug overdose deaths in our local area. Ultimately, it is our goal to implement these changes statewide in order to provide better care and health information for the people of our state.

#### **P14 The Utility of Postmortem Tryptase Levels in Intraoperative Anaphylaxis-Associated Deaths**

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The postmortem diagnosis of anaphylaxis remains a challenge due to the lack of specific biomarkers in cases of anaphylaxis-associated deaths. In addition, the morphologic and histologic findings in these cases may be nonspecific or absent, and therefore, the diagnosis is ultimately based on clinical, laboratory and autopsy findings after exclusion of other possible causes of death. Mast cell tryptase (MCT) is a commonly used marker for mast cell degranulation in living patients, and because of its long half-life, postmortem serum levels have been described, in the literature, in cases of anaphylaxis-associated deaths. Nevertheless, elevated MCT levels can be seen in non-anaphylaxis associated deaths such as trauma, and drug overdose. To better understand the utility of MCT in postmortem samples from patients with suspected anaphylaxis, we present the findings in two patients who died intraoperatively and postmortem labs were remarkable for elevated serum MCT levels. The first patient was a 55-year-old female with chest pain, admitted for cardiac catheterization and developed marked respiratory distress and pulseless electrical activity (PEA) shortly after injection of contrast dye. The second patient was a 66-year-old male with bladder cancer admitted for transurethral resection of his bladder tumor. Shortly after administration of anesthesia and intravenous antibiotics, he went into a PEA cardiac arrest and died. In both patients, the postmortem MCT levels obtained from iliac blood were markedly elevated above the reference range of 11.4 ng/mL. Postmortem gross and histologic examination in both cases showed interstitial edema of the laryngeal mucosa and surrounding soft tissue. Therefore, given the clinical history, circumstances of death, autopsy findings and concordant elevated tryptase levels, the cause of death in both cases was anaphylaxis. It is important to note that serum MCT levels alone are not diagnostic of anaphylactic-related deaths, but in the appropriate clinical setting, it can serve as supporting evidence for antemortem anaphylaxis.

#### **P15 A Case of Advanced Lewy Body Disease and Alzheimer Disease in a Young Decedent with Reported History of Amyotrophic Lateral Sclerosis**

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Case Report: We present a case of a 33-year-old man with reported history of "advanced ALS" who was found unresponsive at home in a context suggestive of natural death. Detailed review of the decedent's medical records, which were not available at the time of autopsy, later revealed a three-year history of worsening bradykinesia, tremors, muscle rigidity, and cognitive decline characterized by progressive memory impairment. He had no history of hallucinations, delusions, or disordered sleep. An extensive neurological workup prior to death had resulted in a clinical diagnosis of

progressive young-onset Parkinsonism. Gross neuropathologic examination showed only mild pallor of the substantia nigra and slight hydrocephalus ex vacuo. Microscopic examination demonstrated diffuse neocortical stage Lewy body disease (LBD) and high stage Alzheimer disease neuropathologic change (ADNC). The LBD was characterized by extensive alpha-synuclein pathology in the brain stem, limbic structures and the neocortex. Alzheimer disease neuropathologic change was characterized by neurofibrillary tangle and neuropil thread formation in the hippocampus and neocortex (Braak and Braak stage V), frequent hippocampal and neocortical neuritic plaques, and amyloid plaques in the basal ganglia, brain stem, and cerebellum (Thal phase 5). There was no histologic evidence of motor neuron disease.

Discussion: The high density of both neocortical Alzheimer-type and Lewy-type (alpha-synuclein) pathology likely contributed to this decedent's progressive cognitive dysfunction; and his parkinsonian symptoms are explained by brain stem alpha-synuclein lesions. This case highlights the importance of thorough neuropathologic evaluation in complex forensic autopsy cases, particularly when complete medical records are unavailable or delayed. It also introduces an opportunity for clinical intervention: Lewy body disease and Alzheimer disease are both rare diagnoses in young patients, and the decedent's age, in combination with the extent and severity of the histologic findings at autopsy, strongly suggest an underlying genetic etiology for his condition. Clinical genetic testing on autopsy specimens is not widely available; however, in cases such as this one, the decedent's offspring may benefit from genetic testing and counseling to identify potential risk for developing these life-limiting conditions in the future.

#### **P16 Tales from the Crypt: A Case Report of Disseminated Cryptococcosis and Review of the Literature**

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Cryptococcus is a genus of encapsulated fungi that grow in culture as yeasts. *Cryptococcus neoformans* is the most commonly known species, found in soil containing bird droppings, and *Cryptococcus gattii* is found predominately in subtropical and tropical areas, often associated with eucalyptus trees. These fungi can cause a range of disease and pathology—from an asymptomatic pulmonary colonization to life-threatening meningitis and even widespread disseminated cryptococcosis. The organism causes infection after inhalation through the respiratory tract, which can then spread hematogenously with the propensity to localize in the central nervous system. Most healthy individuals are asymptomatic and do not get sick. Immunocompromised patients are at an increased risk of fungal infection and include those with HIV/AIDS, prolonged use of steroid medications, organ transplant recipients, and patients with underlying malignancy, liver disease, or sarcoidosis. In immunocompetent patients, fungal infection diagnosis can often be delayed or overlooked due to vague presenting symptoms (e.g., fever, shortness of breath, cough), and patient history being negative for any underlying cause or risk factors. This can lead to worsening of infection before an underlying etiology is identified and, in regard to disseminated cryptococcosis, can still have a significant mortality rate (12%) in immunocompetent individuals.

We present a case of a 28-year-old male presenting to a local hospital emergency department with a several-weeks history of shortness of breath and cough. He was admitted with acute hypoxic respiratory failure and acute renal failure. Initial workup demonstrated bilateral pulmonary infiltrate and an infectious etiology was suspected. He rapidly decompensated and the cause of his infection was not identified until after death. Blood cultures resulted *Cryptococcus neoformans/gattii* complex growth and the autopsy revealed disseminated cryptococcosis with microscopic multiorgan

involvement. He was considered immunocompetent with no known significant past medical history, taking no medications, and no suspicious social or travel history. A literature review is performed to support the case findings as well as discuss cryptococcal pathogenesis, epidemiology, and patient evaluation and management.

#### **P17 Death Due to Air Embolism During Sexual Intercourse in a Pregnant Woman**

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Venous air embolism is an infrequent, but well-recognized complication of pregnancy with a high rate of sudden death. Many of the cases described in literature are associated with sexual activity, particularly insufflation of the vagina with air during orogenital sex. Under significant pressure, air enters the uterus through the uterine sinuses, travels to the right side of the heart via the venous system and causes obstruction of the pulmonary vasculature ultimately leading to cardiac failure and death. We report the death from a venous air embolism of a 24-year-old, 36-week pregnant woman following sexual intercourse with her male partner. A high level of suspicion for a venous air embolism should be maintained for any sudden unexpected death of a pregnant woman, particularly during sexual intercourse.

#### **P18 Spontaneous Coronary Artery Dissection During the Peripartum Period: A 7.5-Year Review**

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**Background and aim:** Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary syndrome and sudden cardiac death. SCAD cases are more prevalent in women, and are reported to occur in association with the peripartum period. Some systemic diseases, pregnancy-related changes, and certain medications have been associated with this condition. The aim of the study was to investigate the incidence, pathology, and relevant associations of SCAD cases in Ottawa, Canada.

**Methods:** We reviewed the database of medico-legal autopsy cases at the Forensic Pathology Unit in Ottawa for a period of 7.5 years from July 2010 to December 2018. There were 5879 medico-legal cases performed during this period.

**Results:** We found two cases of SCAD. Both cases occurred in women during the peripartum period. The first case was that of a 42 year old woman who had chest pain and collapsed nine days post-delivery of her fifth child. An autopsy revealed a spontaneous dissection of the left anterior descending artery and an acute myocardial infarction. The second case was that of a 24 year old woman with a history of myotonic dystrophy type 1 who presented with progressive heart failure seven days postpartum. She subsequently developed a cardiac arrest and multiple intracerebral hemorrhages. An autopsy revealed several healed coronary artery dissections spanning multiple coronary arteries. These were associated with healed infarcts of the anterior and posterior walls of the left ventricle.

**Conclusion:** SCAD is a rare event. Women in the peripartum period represent a special population that can present with and die from SCAD. Examination of the coronary arteries can reveal acute or healed dissections. Some systemic conditions like myotonic dystrophy may play a role in their development.

#### **P19 Relapsing Polychondritis as a Cause of Sudden and Unexpected Death with Central Nervous System Involvement**

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Relapsing polychondritis (RP) is a rare inflammatory disease process that affects cartilaginous tissues throughout the body. While the pathogenesis remains unknown, RP is thought to be an autoimmune disorder in which host immune cells are conditioned to attack the body's cartilage, such as the ears, nose, eyes, joints, and airways, resulting in inflammation and destruction of otherwise healthy tissues. Early manifestations of RP include pain and inflammation of the outer ear with sparing of the earlobe, joint pain, nasal congestion and inflammation of the nasal bridge, and shortness of breath. In rare and unusual cases, neurological involvement has been described.

We report a case of a 36-year-old male with a past medical history of asthma and suspected seronegative rheumatoid arthritis/relapsing polychondritis and panuveitis who was found deceased in his residence after complaining of fatigue and dry heaving. In the year prior to death, he had been extensively worked up clinically and diagnosed with RP associated with joint, ear, and eye involvement. He also complained of severe headaches and antemortem imaging showed multifocal edema in the frontal and temporal lobes at times associated with leptomeningeal enhancement, but a definitive neurological diagnosis was unable to be made.

Autopsy revealed abnormal thickening of the external ear, marked pulmonary congestion and edema, and a dusky red-pink discoloration of the left hippocampus and parahippocampal region of the brain. Microscopically, marked granulomatous and lymphocytic inflammation associated with cartilage destruction was found throughout the large airways. A neuropathologic examination was significant for meningoencephalitis involving the left medial temporal lobe without an underlying infectious cause.

Progressive destruction of airway tissue and increased susceptibility to pulmonary infection is the most common cause of death in RP. Central nervous system involvement is exceedingly rare, presenting with highly variable clinical and pathological manifestations. A review of relapsing polychondritis and systemic manifestations will follow. Accurate recognition of this multisystem autoimmune disease as a cause of sudden and unexpected death is critical for proper death certification and to broaden our understanding of this disease.

#### **P20 Multifocal Subcortical White Matter Infarcts as the Cause of Sudden Death in an African-American Male with Sickle Cell Trait**

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Sickle cell anemia is the most common familial hemolytic anemia. In the United States, one out of every 365 African-Americans have sickle cell disease, while one in 13 African-American babies are born with sickle cell trait. A single nucleotide mutation, that changes glutamine to valine in the  $\beta$ -globin gene, creates hemoglobin S (HbS). This single mutation allows deoxygenated HbS to associate into polymers that distort the red cell into a crescentic or sickled shape. There are two major pathologic consequences to red cell sickling: vascular obstruction and chronic moderately severe hemolytic anemia. When individuals have sickle cell trait, the heterozygous form of HbS, only one abnormal gene is present. It has been previously thought that sickle cell trait carries a lower risk for vascular obstruction, particularly stroke. We present the case of a 38-year-old African-American

man, with sickle cell trait, who was found unresponsive in his home. At autopsy, he was found to have a subdural hemorrhage and multifocal white matter hemorrhagic infarcts. Microscopic examination of the white matter and cerebral vessels revealed sickle-shaped red blood cells. Sickled red blood cells were also noted microscopically in sections of the lungs, heart, adrenal glands, and spleen. Although there were no traditional stroke risk factors, such as atherosclerosis, in his clinical history, autopsy demonstrated hypertensive changes in his myocardium and in the arterioles in the brain. The correlation between sickle cell anemia and risk of stroke is well-documented; however, there is increasing evidence that suggests sickle cell trait individuals are also at increased risk of stroke.

#### **P21 Splenic Rupture Due to Acute Hemorrhagic Pancreatitis: A Rare Cause of Hemoperitoneum at Autopsy**

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Acute pancreatitis is an inflammatory disease of the pancreas associated with injury to the exocrine parenchyma. Although symptoms can vary and are often nonspecific, acute pancreatitis is commonly associated with worsening upper abdominal pain, fever, nausea, and vomiting. Biliary disease and alcohol consumption are the leading causes of acute pancreatitis and comprise approximately 70% of cases. Most cases of pancreatitis are associated with recovery, but a subset of cases result in severe disease associated with higher mortality, which can result in sudden unexpected death and fall under the jurisdiction of the medical examiner or coroner. Exam findings can vary from mild pancreatic inflammation and edema to extensive necrosis and hemorrhage with potential involvement of adjacent soft tissues. We report a case of acute hemorrhagic pancreatitis that resulted in hemoperitoneum from a rare complication of atraumatic splenic rupture.

The decedent was a 27-year-old male with no known chronic medical conditions, although he had a reported history of chronic alcohol use. He developed worsening epigastric pain and vomiting that progressed to where he was experiencing dyspnea and appeared pale. Emergency medical services responded and found him with shallow breathing, a weak carotid pulse, and a rigid and distended abdomen. He eventually became pulseless and apneic, and cardiopulmonary resuscitation was unsuccessful. Autopsy revealed significant hemoperitoneum due to disruption of the splenic capsule in the hilar region adjacent to the tail of the pancreas, which was extensively involved by acute hemorrhagic pancreatitis.

The anatomical proximity between the pancreas and the spleen is thought to be a major contributor to the pathophysiology and progression of associated splenic complications due to pancreatitis. The exact mechanism by which this occurs is incompletely understood, but potential mechanisms include localized hypertension from splenic vein thrombosis, direct erosion and dissection of pseudocysts, and leakage of pancreatic enzymes. Although atraumatic splenic rupture due to pancreatitis is rare and the incidence and epidemiology are not yet clearly defined, this complication is well-documented in the clinical literature. To our knowledge, splenic rupture and resultant intraperitoneal hemorrhage due to pancreatitis has not been well described in the forensic literature. This case illustrates the importance of maintaining splenic rupture due to pancreatitis in the differential as an alternative to trauma when the forensic pathologist is confronted with the presence of hemoperitoneum at autopsy. In addition, knowledge of the possible causal mechanisms can help guide the forensic pathologist during autopsy examination.

#### **P22 Two Cases of Metastatic Melanoma at Forensic Autopsy**

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The National Vital Statistics System reported that malignancies accounted for just over one-fifth of the 2.8+ million deaths within the United States in 2017. As such, it is not unexpected that malignancies exist in a substantial number of medical examiner/coroner (ME/C) cases. Occasionally, such malignancies are first identified at autopsy. More commonly, a death occurring in a person with a known malignancy is investigated by the ME/C because death occurred outside of a healthcare setting. It is not uncommon for such cases to be investigated and then released, without autopsy. In other ME/C cases with a known history of malignancy, various investigative findings necessitate the performance of a forensic autopsy. In this report, we present the forensic autopsy findings in two cases involving metastatic melanoma.

Case 1: A 71-year-old male with known stage-IV melanoma died in hospice care five days following presenting to an emergency department after being found obtunded. He had been discharged from the hospital directly to hospice for end-of-life care. Family members contended that he had been completely "normal" six days prior to presentation and suggested that his ex-wife had poisoned him when she provided him with a specially prepared drink during a visit shortly before he was found down. An investigation with forensic autopsy was undertaken. Autopsy revealed metastatic disease involving multiple organs. Toxicology testing of hospital admission blood and a sample of the drink were negative for drugs and toxins. The cause of death (COD) was metastatic melanoma. The manner of death (MOD) was natural.

Case 2 involved a 63-year-old man with known stage III melanoma who died in a single motor vehicle versus tree collision. As there was an initial concern for possible suicide, a complete autopsy was performed. Widespread metastatic melanoma was identified at autopsy, as were severe injuries related to the incident. Subsequent accident reconstruction revealed that the decedent had lost control on an icy patch on the road. There was no indication of suicide. The COD was multiple injuries. The MOD was accident.

The cases are reminders of the importance of performing forensic autopsies on certain persons having known potentially lethal underlying natural disease.

#### **P23 Cardiopulmonary Resuscitation-Related Hemorrhage Discovered at Forensic Autopsy**

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Deaths investigated by medical examiners/coroners are often preceded by cardiopulmonary resuscitation (CPR) administration. In many cases, it is readily apparent that CPR has taken place, with the gross findings of rib fractures with minimal associated hemorrhage. However, in some cases, there may be substantial bleeding, which can make it difficult to determine if the hemorrhage is associated with CPR or from unrelated antemortem trauma. This presentation highlights multiple cases associated with CPR-related hemorrhage.

The cases span decedents ranging from 23 to 94 years old. The cause of death determinations of the cases include natural disease (hypertensive and atherosclerotic cardiovascular disease, chronic obstructive pulmonary disease) as well as suicidal and accidental drug intoxication. The location

and extent of hemorrhage at autopsy vary within the cases, ranging from small amounts but intense soft tissue hemorrhage to collections of blood of variable volumes within body cavities, including the pericardial, pleural, and peritoneal cavities. In some cases, a significant amount of hemorrhage (>1000 mL) was identified. Traumatic CPR-related injury findings at autopsy include internal organ lacerations, soft tissue damage, and fractures (ribs and sternum). In each case, the circumstances of death and autopsy findings allow for unquestionable determination that the hemorrhage was postmortem in nature and related to CPR.

Cases with CPR administration can present in a variety of ways. This case series highlights the variability within ME autopsy cases where it is discovered that postmortem, CPR-induced trauma resulted in hemorrhage. It is important for the forensic pathologist to have all the case history when making a determination concerning a decedent's cause and manner of death. CPR "artifacts" can occasionally introduce confusion, especially when large amounts of postmortem hemorrhage occur. Only with a complete history and autopsy performance will a proper and accurate determination be made concerning these important findings.

#### **P24 Death Following Poison Ivy Smoke Inhalation**

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Urushiol, the active antigen in poison ivy (*Toxicodendron radicans*), is frequently associated with type I and type III hypersensitivity reactions. These reactions most often result in cutaneous symptoms that vary in severity and may at times require medical interventions. Injuries involving other body systems associated with urushiol exposure are far less common. Here we present two unrelated cases of urushiol respiratory exposure status post burning of poison ivy that resulted in cardiopulmonary arrest and ultimately death. Urushiol smoke exposure in both patients was considered a primary or contributory cause of death.

The first case is that of a 42-year-old female with a prior medical history of hypertension, obesity, and poison ivy allergy, who suffered cardiopulmonary arrest after inhaling smoke from burning poison ivy on her property the previous night. Responding emergency personnel noted swollen lips and marked inflammation and edema of the upper airway, making intubation extremely difficult. Despite successful resuscitation, she developed multisystem organ failure and died several hours after hospital admission. The second case is that of a 76-year-old man with a past medical history of hyperlipidemia, hypertension, type 2 diabetes mellitus, and contact dermatitis following poison ivy exposure, who was found dead two days after clearing and burning poison ivy. In both cases, the decedents had complained of "difficulty breathing" and a "sore throat" or "chest pain" after poison ivy smoke exposure and preceding their cardiopulmonary arrest. At autopsy, both decedents demonstrated evidence of respiratory tract irritation/inflammation consistent with smoke/irritant inhalation, including laryngeal and tracheal edema and purulent exudate in the female, and focal hyaline membrane formation and lobar pneumonia in the male. The male also had an acute myocardial infarct.

In both cases, the history, circumstances, and autopsy findings are consistent with urushiol smoke inhalation having either caused or contributed to death. The cases are unique in that they represent the first cases of death related to poison ivy smoke exposure. Clinicians and forensic pathologists should be aware of the fact that urushiol smoke exposure may lead to morbidity and mortality.

#### **P25 Death as a Complication of Urologic Surgery: Two Cases Identified at Autopsy**

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Urologic malignancies account for a substantial number of cancer cases within the United States. Prostate and kidney cancers represent a significant cause of morbidity and mortality, and result in thousands of diagnostic and therapeutic surgical procedures every year. Such procedures are not without associated complications, including death. Complications occur with invasive surgeries such as nephrectomy, as well as less invasive procedures, such as transrectal prostate needle biopsy. We present two post-urologic surgery deaths where autopsy identified post-surgical complications.

Case 1: A 73-year-old man presented with right lower abdominal/flank pain. Work-up revealed a 3 cm mass of the upper pole of his right kidney. He underwent hand-assisted laparoscopic radical nephrectomy without immediate complication. His recovery was uneventful until he was found dead at home, 10 days post-operatively. An autopsy disclosed a 1500 mL hemoperitoneum arising from the kidney resection site, where a plastic surgical clip had become dislodged. The cause of death (COD) was ruled "post-operative complications following right nephrectomy for renal cell carcinoma, with operative site bleeding and hemoperitoneum." The manner of death (MOD) was ruled "accident."

Case 2: A 58-year-old man presented to an emergency department with complaints of fever, shaking chills, and weakness which began after undergoing transrectal prostate biopsy two days previously. He was admitted to the intensive care unit with a diagnosis of sepsis. He developed multiorgan failure, but was seemingly improving on post-procedure day nine when he suddenly became unresponsive. An autopsy revealed approximately 1500-2000 mL of left-sided retroperitoneal hemorrhage. The COD was "complications related to transrectal prostate biopsies, including sepsis and left-sided retroperitoneal hemorrhage." The MOD was ruled "accident."

Deaths related to medical intervention represent some of the most difficult autopsy cases. In such cases, pathologists should strive to do the following: 1) understand the procedures/interventions involved; 2) document all findings; 3) document all natural disease and injuries; 4) determine the COD; 5) determine the MOD; and 6) Recognize that debate exists regarding appropriate MOD certification.

#### **P26 The Impact of the COVID-19 Pandemic on Deaths Due to Motor Vehicle Accident in the States of Maryland**

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Introduction: On March 11, 2020, COVID-19 was declared a worldwide pandemic by Centers of Disease Control and Prevention (CDC). To prevent the spread of the virus, Maryland Governor Larry Hogan issued a stay-at-home order on March 30, 2020 that ended on May 13th when a safer-at-home advisory took place. The aim of this study was to analyze the impact of the COVID-19 pandemic and travel restrictions in Maryland on fatal motor vehicle accidents (MVA).

Methods: The Office of the Chief Medical Examiner (OCME) is responsive for medicolegal investigation of sudden unexpected deaths and deaths due to non-natural causes in the State of Maryland. This is a retrospective study

of all MVA-related deaths investigated by the Maryland OCME from January 2019 to December 2020.

**Results:** Our study yielded a total of 936 fatal MVA cases over the two-year period: 436 cases in 2019 and 500 cases in 2020. Of the 436 cases in 2019, 186 (42.6%) were drivers; 63 (14.4%) motorcyclists; 9 (2%) bicyclists; 74 (16.9%) passengers and 104 (23.8%) pedestrians. Out of 500 cases in 2020, 230 (46%) were drivers; 76 (15.2%) motorcyclists; 12 (2.4%) bicyclists; 62 (12.4%) passengers, and 120 (24%) pedestrians. In 2019, more fatal MVA driver deaths occurred in March, November and December (19-34 deaths per month) and fewer driver deaths in May, June and July (12-13 deaths per month). While in 2020, more fatal MVA driver deaths occurred in March, July and October (26-29 deaths per month) and fewer driver deaths in January (N=10) and December (N=11). There was a 55% decrease in the number of fatal MVA driver deaths when comparing March 2020 (N=29) and April 2020 (N=13) during the state-at-home period; 2019 only saw a 5% decrease during the same time period. The cases increased in May 2020 by 31% when the stay-at-home mandate ended. In 2019, the number of cases gradually increased from October to December (17 to 34). However, in 2020, driver deaths gradually decreased after October (29 to 11) with additional travel and dining restrictions for the holidays.

**Conclusion:** This study reveals an overall increase in total fatal MVAs across the state of Maryland in 2020 when compared with 2019. However, in April 2020, the number of MVA related deaths dropped during the March 30<sup>th</sup>-May 13<sup>th</sup> stay-at-home mandate. The travel and dining pandemic restrictions and stay-at-home advisory did not have the same effect as the stay-at-home mandate.

#### **P27 Forensic Autopsy Cases with Eye Trauma**

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External examination of the eyes is part of every forensic autopsy, with more extensive examination reserved for occasional cases. The eye represents a delicate organ that is only partially protected by the skull and facial bones, and can be easily damaged during traumatic events. As such, forensic autopsy cases with eye trauma are not particularly rare; however, the unique and delicate nature of the eye can make ocular trauma of particular interest in forensic examinations. This report presents a series of forensic autopsy cases associated with trauma involving the eye.

The cases span decedents ranging from infancy to old-age. The causes of death and eye injury types include sharp force injuries, blunt force injuries, asphyxial injuries, and gunshot wounds. There are a variety of scenarios and/or objects involved in these cases, with some having a unique injury pattern to the eye, but with many having only generalized globe trauma. In some cases, the eye trauma represents a major injury site related to the cause of death, whereas in other cases, the eye trauma is only part of a constellation of other injuries. In one case, the eye trauma is remote and only circumstantially related to the cause of death. In a group of related cases, the eye injuries were intentionally inflicted by a perpetrator after having killed his victims. The manners of death for the cases include homicide, suicide, and accidental.

This case series highlights the variability within medicolegal autopsy cases having eye trauma. While certain cases have specific features related to the unique anatomy of the eye, many cases involve injuries that are similar to those occurring in other anatomic locations, with variations related only to the delicate nature of the eye. In occasional cases, ocular trauma may

provide valuable information regarding the motives and/or mental state of those producing the eye injuries.

#### **P28 Use of Uncommon Methodologies to Extract and Interpret Medicolegal and Clinical Data**

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The autopsy is the gold standard for retrospective quality assessment of clinical diagnoses and serves as a critical medicolegal, public health, and educational tool. Autopsies generate a vast pool of data that is underutilized by forensic science researchers. As part of a larger project studying discrepancies between clinical diagnoses and autopsy findings among patients that underwent postmortem examination pre- and post-coronavirus pandemic, our team used two methodologies that are uncommon in forensic science research, an iterative process and Natural Language Processing (NLP), to improve the quality and ease of data extraction from a medicolegal database. Here we will demonstrate the benefit of these methods.

During literature review for our larger project, it became evident that similar data extraction studies were vague when describing how concordance in data collection and interpretation was reached amongst researchers. This lack of transparency makes the validity of the findings less trustworthy. To resolve this issue with our data extraction process, we implemented an iterative process, a sequence of steps whereby researchers continuously repeat and refine their methodology to minimize inter-observer error. This method is commonly employed in qualitative research but less often in forensic science research.

In the medicolegal database we used, data were separated into structured and unstructured inputs. Structured data is often put into discrete data fields with standardized responses or parameters (e.g., age, height). In contrast, unstructured data is recorded without standardization or parameters, often in a free text field. To increase sample size, we used a method to search the unstructured data in death investigator narratives to discover additional cases that met our investigators' inclusion criteria. Our method involved the use of Canary, a free and open-source NLP platform designed for users without NLP or software engineering experience. NLP facilitates the intelligent extraction of meaningful information fragments from unstructured text, with Canary supporting using user-defined grammars and lexicons. Employing creative methods of data extraction could improve the quality of future studies in forensic science and medicine. Although these methodologies were used to achieve the goal of one specific project, they apply to many research goals. Iterative processes can allow an increased number of researchers to work on a project without sacrificing validity, and NLP can increase data extraction capacity and speed within unstructured data sets. Using these atypical methods alongside autopsy data could open the door to new and exciting avenues of research.

#### **P29 An Analysis of the Suicide Demographics of the Eastern Ontario Regional Forensic Pathology Unit**

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**Introduction:** Death by suicide in Canada accounts for approximately 4,000 deaths annually. Although deaths by suicide are reported nationwide, analysis on a local scale is lacking. No analysis of suicide deaths has been performed at the Eastern Ontario Regional Forensic Pathology Unit (EORFPU).

**Study Population:** This study was initially intended to examine the demographics of suicide deaths in the EORFPU between 2015 to 2018 but due to delays in research approval, pandemic restrictions and other academic constraints, the study period was decreased to 2017/2018.

**Methods:** Cases with suicide as the manner of death were retrieved from the EORFPU database with the permission of the Office of the Chief Coroner for Ontario. One-hundred-sixty-seven cases were identified. Anonymized data were extracted from the Coroner Investigation Statements and descriptively analyzed for a variety of demographic parameters according to year and month of death, age, sex, cause of death, scene of death, presence/absence of a suicide note, medical and psychiatric history, previous suicide attempts, precipitant event, relationship status, living circumstances, occupation and other factors which may have contributed to death.

**Results:** The most common method of suicide was asphyxia by hanging (46%). 77% of decedents died within their residence and 33% lived alone. The median decedent age was 49.5 years. The male to female sex ratio was 3.2:1. A suicide note was found in 27% of cases. 31% and 23% of the case population in the EORFPU was recorded to have had at least one prior suicide attempt with 2.3% and 4.9% of decedents recording 3 or more prior attempts (2017 and 2018 respectively). Using a defined criterion based on current literature, 68% of the total cases were planned, 13% overall were impulsive, and 20% were undefined. The most prevalent contributing factor recorded was depression at 39% over the two-year span (43%, 35%) followed by alcohol abuse at 9.6% (9.3%, 9.9%) and unspecified mental illnesses accounting for 9.0% of the total case population (8.1%, 9.9%). 18% of the case population was found to have an unspecified medical history. The most prevalent medical issue recorded was cardiovascular disease (26%, 25%), followed by musculoskeletal conditions (13%, 14%) for 2017 and 2018 respectively.

**Discussion:** This study provides a descriptive, comparative analysis of suicide deaths in the EORFPU and notable trends are highlighted. These trends, outlined in a retrospective manner, can be used as a guide to further investigate this complex topic.

### **P30 The Pathology Club of the University of the West Indies**

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The Pathology Club of the University of the West Indies (Pathology Club of UWI) is the first club of its kind in the history of The University of the West Indies founded at the Faculty of Medical Sciences, UWI, St. Augustine campus. The club's vision is to foster the interest of Caribbean medical students in pathology and laboratory medicine (PALM) and provide support to those aspiring to specialise in PALM through mentorship, shadowing and research opportunities across the faculties of medicine at its campuses in Trinidad and Tobago, Barbados and Jamaica.

The Pathology Club of UWI was launched at an Inaugural virtual event on 6th August 2020 and includes members from the three campuses of the UWI. Virtual activities and events highlighting various pathologies and fields of pathology are held weekly and monthly respectively, and club members are engaged to participate in activities via WhatsApp, Instagram and Facebook. The Caribbean Pathology and Laboratory Medicine Student initiative was also established by the club and launched in August 2020 to stimulate interest in PALM among undergraduate medical students in the Caribbean.

The club has been a massive success and positive feedback has been received from club members and guests at virtual events. There are 265 members from the three campuses of the UWI with 241 students from St. Augustine, Trinidad and Tobago, 22 from Mona, Jamaica and 2 from Cave Hill, Barbados. The club has three social media platforms with a total of 598 followers/subscribers. Instagram has 482 followers, Facebook 61 followers and YouTube 55 subscribers.

The club has served to spark the interest of undergraduate medical students in pathology and laboratory medicine across the three campuses of the University of the West Indies. Many students have expressed interest in pursuing postgraduate training in pathology and laboratory medicine and the activities, initiatives and events have effectively served to highlight the scope of pathology and laboratory medicine and inspire students to pursue careers in this field. The establishment of similar clubs in US medical schools is one way of addressing the recruitment issues into forensic pathology which the US is currently facing; with less than half of the 1100 forensic pathologists that are needed to deal with the ever-increasing annual medicolegal postmortem examination workload.

### **P31 Postmortem Point of Contact (POC) Urine Drug Screening with Quantitative Confirmation During COVID-19 Global Pandemic and Pros and Cons for Utility in Cause of Death or Manner of Death: A Pilot Study**

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Post Mortem forensic toxicology is pivotal for deciding the poison or drug responsible to cause death in the medical legal arena.

Urine is a postmortem forensic sample for toxicological analysis and it has been neglected and not collected. The speed and facility of the urine matrix makes it valuable.

This pilot study examined 17 cases from July 2020 to April 2021. In each case, a point of contact (POC) cup was obtained directly from the bladder with a 17 gauge needle and a 30 mL syringe. POC cups measured the following: amphetamine, buprenorphine, benzodiazepine, cocaine, methamphetamine, ecstasy, methadone, morphine, oxycodone, THC, alcohol, fentanyl, and tramadol.

52.92% POC cups were collected from females and 47.05% of POC urine cups came from males.

All POC cups were developed during the forensic autopsy according to the instructions provided and results were noted but blood was also collected for confirmation and sent to NMS laboratories, Horsham, PA.

The decedents age, gender, drugs present, manner of death, cause of death and likely drugs involved in overdose were recorded. Cause of Death demonstrated ten drug or alcohol related deaths, one gunshot wound to the head, one suicide by hanging, one blunt force trauma motor vehicle accident, one blunt force trauma boating accident, one thyroid related death, one atherosclerotic vascular death, and one hepatic related death. Manner of Death included 10 overdose deaths as accident and two blunt force trauma as accident, three natural deaths, one homicide and one suicide. The average age was 38.8 years old.

Data were analyzed in 76.4% of all POC cups and confirmation data was 100% congruent to confirmation Blood testing. The 23.5% of the cups that were not a perfect match to confirmation metrics were not wrong. The translation in a 13 panel thin layer chromatography POC toxicology to mass

spectroscopy does not always translate to the same drugs being tested.

63% of all drug related accidental deaths were fentanyl intoxication deaths. The study led to some important points relevant for the medical legal toxicology domain listed below:

#1. It was feasible to collect sufficient quantities of postmortem urine for forensic POC Toxicology.

#2. There was no effect that would have changed manner of death or cause of death in the translation of a POC toxicology to a confirmation mass spectroscopy.

#3. Point of Contact cups (POC) were sensitive enough to reflect the damaging influx of fentanyl.

### **P32 Unusual Origin of Fatal Vehicle Fire Related to Alcohol and Drug Intoxication**

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A 57-year-old substance-abusing alcoholic man was found dead in front of his home in his burning vehicle. Neighbors reported that they could hear the car revving repeatedly at a high rate for approximately three hours, until 2:00 a.m., when an explosion triggered a neighbor's home camera, which caught part of the explosion and flames. 911 received multiple calls. No other person was documented anywhere in the vicinity.

Scene and fire marshal investigation showed that the car's tires had blown out, causing the exploding noise. The front end of the vehicle sustained the most damage; the fire broke through the engine compartment on the passenger side of the dashboard, and continued across the roof. During their investigation, a second fire ignited in the rear of the car, possibly from a damaged gas line.

At autopsy, the decedent showed heavy soot deposition on his hands, neck, and chest, accelerant-type areas of oval cratering on his head and upper thighs, and areas of perimortem or postmortem skin slip including partial degloving of his hands. There were no internal injuries and no significant natural disease. Carboxyhemoglobin was reported at ~47% saturation. Toxicology also identified alcohol at 0.238% by weight by volume, and cocaine, cocaethylene, and marijuana metabolites. Death was attributed to smoke inhalation and thermal injuries.

Neighbors told police that he had owned the car for two months; they knew it had both oil and radiator coolant leaks. Law enforcement suggested that he might have become obtunded from alcohol and drug use in the driver's seat, with his foot on the accelerator, causing the repeated revving. Alcohol and drug use are present in many fire deaths, with 29.5% of fire fatalities in one study demonstrating ethanol intoxication averaging 193.9 mg/dl, and 14.6% showing abused drugs.

After oil leaked to form a puddle under the car, and the radiator coolant also leaked out to overheat the engine, the fire marshal believed that fire sparking the oil puddle caused the car fire, tire explosion, and death of the occupant.

After correlating the autopsy results with the investigative findings, the manner of death was deemed accident.

### **P33 Sudden Death in a Young Woman with Systemic Lupus Erythematosus**

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Herein we present a case of cardiac arrest shortly after presentation to the emergency room in a young patient with autoimmune disease in order to explore thrombotic microangiopathies as an unusual, but important, cause of sudden death in individuals without underlying atherosclerotic or structural/ genetic cardiac disease. A 42-year-old woman presented to the emergency room with altered mental status after four days of headache, vertigo, nausea, heavy menstrual bleeding, bruising, and acute chest pain. Her past medical history included systemic lupus erythematosus with a history of positive antiphospholipid antibodies and associated complications including recurrent pericarditis, inflammatory arthritis, Raynaud's with digital ulcerations, and ventricular tachycardia with ablation. Laboratory evaluation showed severe thrombocytopenia and hemolytic anemia with evidence of a microangiopathy (schistocytes) on peripheral blood smear. Troponin was elevated (0.79 ng/mL) without ECG changes and imaging was negative for pulmonary embolism or acute intracranial pathology. While being transferred to the ICU, she developed pulseless electrical activity cardiac arrest refractory to resuscitation and was declared dead. Given the history of prior positive antiphospholipid antibodies, catastrophic antiphospholipid syndrome (CAPS) was suspected. At autopsy, thrombocytopenia was evidenced by cutaneous and visceral petechiae, particularly within the right heart. Histologic evaluation demonstrated extensive myocardial involvement by fibrin microthrombi with associated diffuse acute hemorrhagic microinfarcts. Fibrin microthrombi were also identified in the arterioles of bilateral kidneys with associated features of acute tubular injury. Brain exam showed scant pituitary microhemorrhages with microthrombi and a single early acute cortical microinfarct. Overall, clinical and autopsy findings were consistent with a diagnosis of thrombotic microangiopathy (TMA) with significant myocardial involvement resulting in sudden cardiac arrest. TMAs are a rare group of life-threatening disorders characterized by platelet activation and consumption (thrombocytopenia) with formation of microscopic thrombi in small vessels of various organs leading to ischemic organ damage and dysfunction. Hemolytic anemia caused by red blood cell destruction within the abnormal microvasculature (i.e., microangiopathy) is a defining feature. While the patient had many features concerning for CAPS, antemortem serum testing was negative for antiphospholipid antibodies and her other findings did not meet diagnostic criteria for the syndrome. Based on postmortem serum positivity for ADAMST13 antibodies with decreased protease activity, a diagnosis of Thrombotic Thrombocytopenic Purpura (TTP) was favored as the etiology of TMA. CAPS and TTP are often considered part of an overlapping spectrum of TMAs which are more common in patients with lupus. In practice it may not be possible to distinguish them.

### **P34 An Introduction to Photogrammetry for Pathologists**

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The purpose of this project was to explore the possibility of using photogrammetry create three-dimensional (3D) models of pathology specimens using consumer level equipment. This is important because there is potential to have 3D models of specimens as a resource without a large investment in specialized equipment. A variety of specimens were attempted to understand the potential limitations. Challenges were observed when attempting to create models with all sides visible, due to the change in shape when moving the model. Models were successfully created when left in place with only the camera and turn table changing position. This process can also be time consuming, requiring about 30-45

minutes for equipment setup, photography, and take down, and approximately 2-3 hours to mask the images and publish a 3D model. 3D printing a sample model yielded remarkable results, and home-made attempts to create a mold to produce silicone and Play-Doh duplicates were satisfactory. These models have potential to be used as an aid in pathology education and forensics.

**P35 Case Report: Detection of Novel Psychoactive Drugs in the Context of Fentanyl and Heroin Use**

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New or novel psychoactive substances (NPS) continue to infiltrate the illicit drug market, posing a formidable challenge to detection by medical examiners/coroners (ME/C) and postmortem toxicology laboratories. These substances are intended to mirror the pharmacological effects (e.g. euphoria) of established prescription/scheduled medications or illicit drugs; they are purportedly “legal alternatives” and attempt to circumvent legislative control. First generation designer opioids emerging in the illicit drug supply primarily included potent analogs to fentanyl (“fentalogs”). Predictably, scheduling initiatives heralded a decline in evolving “fentalogs”. With this decrease, a concomitant rise in the prevalence of other synthetic opioids followed. Likewise, flualprazolam, a nonregistered agent in the benzodiazepine class, became available over the Internet and the illicit drug market. Herein we describe a case, in the context of apparent heroin and fentanyl use, which includes detection of two designer opioids (bupropion and metonitazine) and a designer benzodiazepine (flualprazolam).

The decedent, a 50-year-old Black female, was discovered lying on the bathroom floor in a home by her boyfriend upon his return to the residence. Paramedics were summoned and discovered signs of life, administered Narcan and transported the woman to the ED. The decedent arrived in full cardiac arrest and could not be resuscitated. The decedent had a notable medical history of CHF, HTN and an implanted pace maker, and was known to abuse heroin and cocaine/crack. An autopsy was performed by the Office of the Lake County, IN Coroner.

Femoral blood was submitted for toxicological analyses. Analytical testing included a screen for volatile compounds and a comprehensive drug screen by high resolution mass spectrometry or HRMS, specifically Liquid Chromatography Quadrupole Time of Flight Mass Spectrometry (LC-QTOF-MS). The comprehensive screen includes surveillance of novel substances such as designer opioids, novel psychoactive substances (designer benzodiazepines, cathinones/“bath salts”) and synthetic cannabinoids. Toxicological findings include: Ethanol (0.287%), diphenhydramine (220 ng/mL), metoprolol (104 ng/mL), 6-AM (19.3 ng/mL), morphine (82.3 ng/mL), fentanyl (5.9 ng/mL), and the qualitative presence of bupropion, metonitazine and flualprazolam.

The cause of death is the toxic effects of fentanyl, heroin, and alcohol with a manner of death of accident.

**P49 WITHDRAWN**

**P37 Sleep-Related Infant Deaths in Georgia: Are We Seeing Change?**

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Introduction: Cosleeping or bed-sharing with infants is considered a significant risk factor for an asphyxial death. Additionally, unsafe sleep

conditions including a prone sleeping position, soft sleeping surface, adult-sized bed, excessive bedding, etc., also pose the same risk. In 2016, the state of Georgia initiated its “Safe to Sleep” campaign, in which birthing hospitals statewide educated parents and caregivers on the safe infant sleeping environment recommended by the America Academy of Pediatrics. Using data on infant deaths from the Georgia Bureau of Investigation Medical Examiner's Office (GBI MEO), which includes three offices serving over 150 counties throughout the state, we sought to determine whether there was a significant decrease in sleep-related infant deaths following the “Safe to Sleep” initiative.

Methods: Data on all infants (12 months of age or younger) autopsied at the GBI from 2011-2019 were collected utilizing the GBI Child Abuse Investigative Support Center (CAISC) data, which listed the demographics of the cases as well as the cause and manner of death. Of these, a portion are considered by CAISC to be “sleep-related” with the criteria being an infant placed to sleep and found unresponsive. This includes deaths associated with an unsafe sleep environment with cause of death ascribed to sleep-related asphyxia, Sudden Infant Death Syndrome (SIDS), Sudden Unexpected Infant Death (SUID), or undetermined. The percentage of sleep-related infant deaths was calculated for all years.

Results: The yearly percentage of infant deaths that were considered sleep-related are as follows: 77.2% (122/158) in 2011, 73.9% (116/157) in 2012, 77.3% (102/132) in 2013, 78.3% (112/143) in 2014, 73.6% (128/174) in 2015, 75.3% (113/150) in 2016, 63.3% (100/158) in 2017, 80.2% (130/162) in 2018, and 77.9% (116/149) in 2019.

Discussion: An astonishingly large percentage of yearly infant deaths are sleep-related. Despite interventions occurring in the state, we have seen no consistent decrease in the percentage of infant deaths associated with unsafe sleep conditions. While it may be too soon to appreciate the statistical impact of the 2016 campaign, our findings suggest that additional interventions or a new approach are necessary to combat this possibly preventable cause of infant death.

**P38 Postmortem Fungal Growth in the Trachea Mimicking Antemortem Foreign Body Airway Occlusion**

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Fungi are ubiquitous in the environment and can be seen growing on human bodies postmortem. When present, these fungal colonies are typically found on the external surfaces or inside the orifices of a decomposing body. However, fungi found growing on the internal surfaces of the human body are not commonly seen. Here, we present two cases of postmortem fungal growth within the upper respiratory tract. Postmortem fungal growth within the trachea may be confused with an aspirated foreign body and should not be misinterpreted as antemortem airway occlusion.

**P39 Sudden Cardiac Death of a Child with Three Coronary Arteries Originating from the Right Sinus of Valsalva**

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Anomalous aortic origin of the coronary arteries (AAOCA) is a rare congenital malformation of the heart that is described in the literature with several variations. Typically, it involves the origin of either the right or left main coronary artery originating from the incorrect sinus, or in some cases, originating from a single ostium. The course of these vessels can increase

the likelihood of sudden cardiac death, particularly if they pass between the aorta and the main pulmonary artery. Other features known to obstruct blood flow are acute angle take offs and ridge like defects on the ostia. We report on a case of an eight-year-old female with a history of repaired congenital membranous subaortic stenosis, who had shortness of breath and collapsed following physical exertion. Autopsy revealed an anomalous distribution. The right, left anterior descending, and circumflex arteries arose from a single out pocketing of the right sinus of Valsalva. This is a rare malformation, and increases our understanding of AAOCA to better diagnose and treat patients presenting with this disease.

#### **P40 Virtual Education in Forensic Pathology: Wayne County Medical Examiner's Office Experience**

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In February of 2020, the Wayne County Medical Examiner's Office in partnership with the University of Michigan launched the Detroit's Daily Docket podcast (DDD). The goal of this podcast was to educate the general public about forensic pathology as well as the lesser-known aspects of death investigation and generate more interest in our field. We used our experiences, collaborative work style, and a variety of staff at our establishment to discuss various forensic pathology topics. To date, we are the only medical examiner's office to do so. With the advent of the COVID-19 pandemic, DDD has become a valuable tool in the education of our medical rotators whose in-person experiences were forcibly suspended to limit potential exposure.

As in many other fields, the traditional modes of operation in health care and education have been disrupted and were replaced with socially-distanced methods. Examples of other specialties describing how they have adapted to the current way of life can be found in contemporary literature. However, there are few articles about pathology and none about forensic pathology as of the writing of this manuscript.

Pre-pandemic, the use of virtual communication technologies was on the rise. Today, it has become ingrained in the educational world, utilizing teleconferencing and virtual lectures; this has also been the case at our office. Our in-person board review lectures are now given virtually. The podcast has also been used as another form of lecture for our residents and medical students. The pandemic also limited our ability to physically teach the postmortem examination within the autopsy room; thus, an Instagram page was created. This provides high quality educational photography to supplement the needed visual learning in our field.

The above ventures have had many positive intended and unintended consequences. Our office educates the surrounding five pathology programs; attendance at our board review lectures has increased significantly now that they are virtual. The podcast and the Instagram page have been very well-received by both the public as well as medical rotators; interest in FP and death investigation has increased and these tools have served as good recruitment methods for our office. Furthermore, we realize these forms of social media have become a valuable source of learning that will be able to be used for future years. The use of social media and technology has only improved and enhanced our ability to educate during a pandemic.

#### **P41 An Unusual Suicide by Sodium Azide**

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Sodium azide is a white to colorless, tasteless, odorless crystalline powder most often used as a propellant in automobile airbags, but also has utility as a chemical preservative in laboratories, an herbicide and soil fumigant in agriculture, and a component used in the manufacturing processes of latex, rubber, seed, and wine. Presented here are the scene, autopsy, and toxicological findings of a suicide due to ingestion of sodium azide.

The decedent was a 31-year-old white man with a history of depression, obsessive compulsive disorder, spastic diplegic cerebral palsy, and suicidal ideations who had reportedly been "feeling down" for the past four days. He was found dead on the floor of his residence approximately 14 hours after last being known alive. A measuring cup with white residue was found next to the decedent. An empty bottle labeled "Sodium Azide NaN<sub>3</sub>, 25 g" that contained white powder residue was found in the decedent's pocket.

On external examination at autopsy, the decedent had cyanosis of the lips. On internal examination, there was dusky discoloration of the epiglottis, upper larynx, and upper esophagus and marked pulmonary edema with abundant foam on the mucosal surface of the major bronchi (combined lung weight: 1170 grams). The stomach contained 70 milliliters of yellow-tan mucoid material. The aforementioned measuring cup and empty bottle from the scene along with blood and stomach contents were submitted to the Laboratory Division at the Federal Bureau of Investigation. Sodium azide was detected in the measuring cup and the bottle. Hydrazoic acid (HN<sub>3</sub>) was identified in the stomach contents, which indicated exposure to an azide containing compound. Blood was submitted to NMS Labs which detected 0.40 µg/mL level of cyanide and a 26% methemoglobin saturation. The cause of death was classified as sodium azide toxicity. The manner of death was suicide.

Reports of deaths related to suicidal ingestion of sodium azide are extremely rare in the literature. Recognition of this entity is important within the forensic community so that appropriate specimens are collected and sent out for testing quickly given that sodium azide is extremely labile. Additionally, proper precautions at the scene, specimen handling, and autopsy safety should be considered with these cases.

#### **P42 Rare Case of Homicide by Air Gun with Bullet Embolism**

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Accidental death due to pellets from an air gun remain relatively low, mainly occurring in children. Homicides from use of a pellet gun are extremely rare, with four cases presented previously in a literature search, and only two with penetrations of the thoracic cavity. This fifth case of a homicide and third to a penetrating wound to the thoracic cavity with an air gun involved a woman who was being attacked and chased by the decedent with a machete. Two shots were fired from a 0.177 caliber Ruger Air Hawk 2 air rifle, with correlating entry wounds to the decedent's right leg and torso (left chest). The following autopsy revealed the shot to the thoracic region was the fatal injury with the trajectory of the pellet missing the heart but penetrating the distal aspect of the left superior pulmonary vein, where it became an embolus. It entered systemic arterial circulation via the left side of the heart and eventually lodged in a vessel downstream from the site of origin. The decedent died from exsanguination into the thoracic cavity due to the pierced vein with the pellet found in the popliteal artery of the left leg. The rarity of this case should lend to the discussion of penetrating injuries due to these small caliber, high velocity weapons for which it is normal for children to have open access to them. Cases like these are important to the

emergency physician who may be treating a victim, and the forensic pathologist who is performing the autopsy, as pellets may have embolized to another location downstream in the vasculature. It is also important for the treating physician and the pathologist to realize that some air guns have a higher velocity than some common handguns, leading to lethal penetrating injuries.

#### **P43 Fulminant Hypereosinophilic Syndrome Consistent with Churg-Strauss Syndrome Presenting at Autopsy**

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Eosinophilic granulomatosis with polyangiitis, otherwise known as Churg-Strauss Syndrome, is a small vessel vasculitis that usually affects small to medium vessels, with extravascular granulomas and eosinophilic infiltrates in multiple organs throughout the body. This disease process is typically associated with asthma, allergic rhinitis, lung infiltrates, peripheral hypereosinophilia, and extravascular necrotizing granulomata. This diagnosis can be made using the American College of Rheumatology criteria or the Lanham criteria, though typically is made based on a combination of eosinophilia, asthma, rhinitis, and histopathology from the lung or other organs affected with eosinophilic infiltration. One such case was a 32-year-old female with no significant medical history who presented to the emergency department of a local hospital after being found unresponsive at home. The decedent was scheduled for a breast biopsy on the day of death to assess for possible cancer. An autopsy revealed a heart with the following gross findings: mild dilatation of the ventricles, widely patent coronary arteries, diffuse necrosis and fibrosis of the left myocardium, endocardium, and interventricular septum. Each lung weighed about 1400 grams, were moderately congested, with multiple white nodules up to 2 centimeters in size. The rest of the gross autopsy findings were unremarkable. Histologically the heart revealed an eosinophilic myocarditis with myocyte necrosis and vasculitis; microscopic examination of the lung revealed an eosinophilic pneumonia with a noncaseating granuloma and eosinophilic vasculitis; the liver revealed a microabscess containing numerous eosinophils; and the breast revealed a necrotizing eosinophilic mastitis with abscess formation. The cause of death was fulminant myocarditis. Hypereosinophilia syndromes are rare and in one study showed a prevalence between 0.36 to 6.3 cases per 100 000 patients. Eosinophilic granulomatosis with polyangiitis (EGPA) has a mean age at diagnosis of 40 years. The prognosis is variable, depending on the course of the disease at the time of discovery. Microscopically there are three main features: leukocytoclastic vasculitis, tissue infiltration with eosinophils, and extravascular granulomas with fibrinoid or eosinophilic central necrosis. This case study is an example of an entity that can affect the young and lends to discussion of rare findings that may not be encountered commonly at autopsy.

#### **P44 Association Between Dementia Including Alzheimer Disease and Death Near Bodies of Water**

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Context: Alzheimer disease is the most common neurodegenerative disease with disorientation as a common symptom. We identified a possible association between dementia and death near water bodies in Eastern North Carolina. Few studies have examined wandering behaviors in Alzheimer patients with deaths near water. We are unaware of a study including histological documentation of the underlying disease process causing dementia and correlation with wandering behavior.

Methods: A six-year retrospective study of drowning deaths from our medical examiner's office was conducted.

Results: Drowning as the cause of death was determined in 135 cases; autopsies were performed in 96. A clinical history of dementia was known in 10 (Alzheimer disease: 6; Huntington disease: 1; Neurosyphilis-associated dementia: 1; Frontotemporal dementia: 1; dementia not specified: 1). The average age of decedents with a clinical history of Alzheimer disease was 83.6 years; male-to-female ratio 4:2, constituting 33.3% of all autopsy cases over 65 years. All were found within or near a body of water. Histological examinations were completed on two cases. Neuropathologic evaluation confirmed Alzheimer disease was seen in one patient and frontotemporal lobar degeneration was identified in one patient.

Conclusions: Our findings indicate possible association between dementia and accidental death in bodies of water. Data in our series is limited to calculate the statistical significance. Despite our small numbers, a positive correlation is noted. Our series showed a higher incidence of Alzheimer disease (17%). Close supervision should be provided to patients with dementia.

#### **P45 Occult Presentation of Sinusoidal Diffuse Large B-Cell Lymphoma of the Liver Found at Autopsy**

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Introduction: Diffuse Large B-Cell Lymphoma (DLBCL) is the most common type of non-Hodgkin lymphoma, comprising 25-35% of adult non-Hodgkin lymphomas in developed countries. As many as 40% of cases are confined to extranodal sites, though only a small fraction arise in the liver and only one such case to date has shown a sinusoidal growth pattern. Liver sinusoidal involvement by lymphoma is undetectable on routine imaging. Changes in the patient's complete blood count are often attributed to acute liver failure. These barriers combine to make it very difficult to diagnose sinusoidal lymphoma and highlight the importance of anatomic pathology in the diagnostic process.

Methods: A 72-year-old female on the liver transplant list passed away, after transferring to University of Maryland Medical Center, in acute liver failure of unknown etiology. An autopsy was performed.

Results: Gross findings at autopsy include liver congestion and plaques on the lung bases suggestive of metastatic disease. H&E sections demonstrate large lymphoid cells with cytologic atypia present in all organ systems, but most prominently in the hepatic sinusoids, as well as forming pleural plaques and involving the bone marrow. Immunohistochemical stains demonstrate positivity for CD20, PAX5, CD5, and MUM1, and negativity for CD 10, BCL6, Cyclin D1, SOX11, CD30, TdT, and ALK1. The Ki67 proliferation index was high (60%), and an EBER in situ hybridization stain was negative. Findings are consistent with a DLBCL of non-germinal center B-cell type (non-GCB, Hans algorithm). The sinusoidal growth pattern is highly unusual in DLBCL, and is associated with adverse prognosis in limited reports despite aggressive chemotherapy regimens.

Conclusion: Aggressive lymphomas can represent a potentially challenging diagnosis, and awareness of unusual morphologic patterns / occult presentations is important in critically ill patients. This case highlights an unusual growth pattern of a common non-Hodgkin B-cell lymphoma, which may represent a specific subtype with characteristic pathologic features; this is the first reported occult presentation, and highlights the importance of the autopsy procedure.

#### **P46 Effect of the COVID-19 Pandemic on Adolescent Suicides in Georgia**

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Introduction: Adolescent suicide in the United States has steadily increased since 2010. Between 2010 and 2014, suicide was the fourth leading cause of death for adolescents (less than 18 years old) in both the United States and Georgia. Between 2015 and 2019, suicide was the second leading cause of death for adolescents in the United States and the third leading cause of death in Georgia. Then, in 2020, the world was abruptly confronted by the COVID-19 virus pandemic. National and state media publicized a perceived increase in the number of suicides resulting from social isolation. Using data on adolescent deaths from the Georgia Bureau of Investigation Medical Examiner's Office (GBI MEO) and data obtained from the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS), we sought to determine whether there was a significant increase in adolescent suicides in 2020.

Methods: Data from WISQARS were collected using the following parameters: 2010-2019, United States, Georgia, all races, both sexes, all Hispanic origin, Top 10 number of causes, all categories of causes, and ages 1 to 17 years of age. Data on adolescent suicides autopsied at the GBI from 2015 to 2020 (all 12 months of 2020 data available) were collected utilizing the GBI Child Abuse Investigative Support Center (CAISC) data, which provided the age, sex, race, cause of death, and manner of death. Data was also gathered on population statistics of individuals under eighteen years of age from the Annie E. Casey Foundation website.

Results: From 2015 to 2019, the GBI MEO adolescent suicides comprised an average of 64.54% of Georgia's total number: 65.38% (34) in 2015, 68.42% (39) in 2016, 66.10% (39) in 2017, 63.49% (40) in 2018, 59.32% (35) in 2019, and 67.21% (41) in 2020.

Conclusion: The GBI MEO, which services 153 of 159 counties in Georgia, saw an increase in adolescent suicides in 2020 compared to 2019. The 2020 data is similar to the historical average of adolescent suicides for 2015-2019. However, adolescent suicide deaths at the GBI MEO decreased in 2019 in comparison to 2015-2018. This study does not provide conclusive evidence of the statistical impact of the COVID-19 pandemic on adolescent suicide in the state of Georgia. Evaluation of future annual data for such deaths is necessary, as the mental and emotional impact of the pandemic may take time to surface.

#### **P47 A Case of Fatal Very Late Stent Thrombosis Following Cessation of Clopidogrel**

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Drug eluting stents have revolutionized revascularization in percutaneous intervention over the years but not without risk of thrombosis long after insertion. Drug eluting stents impair reendothelialization, resulting in a prothrombotic environment, impair endothelial function which can lead to ischemia and contribute to thrombosis formation unlike bare metal stents. The incidence of very late thrombosis is scarcely mentioned in the literature, with limited reports referencing 0.4% to 0.6% after 12 months. This is a rare case of fatal very late stent thrombosis following cessation of Clopidogrel. The decedent was a 78-year-old male who had recently been discharged home from a seven-day hospital admission following a fall. The decedent's medical history including coronary artery disease and stenting back in several years currently on Clopidogrel, as well as diabetes, hypothyroidism, and hypertension. He had been managed medically for injuries sustained secondary to the fall including clavicular and rib fractures and a small

subdural hematoma. Medications prescribed at discharge included a beta blocker, statin, insulin, a diuretic and thyroid hormone, and discontinuation of Clopidogrel. Four days following discharge he developed radiating chest pain while at home. EKG showed ST elevations in V2-V5 and he was found to be in cardiogenic shock upon EMS arrival. He suffered a cardiac arrest shortly after hospital admission that day and died despite resuscitative efforts. The case was cleared by the medical examiner's office and the family requested an autopsy. The autopsy revealed severe three vessel atherosclerosis, an acute in-stent thrombosis extending proximally and distally in the left anterior descending artery. The myocardium showed an acute, healing, and healed transmural infarct within the posterior right ventricle, left ventricular free wall, and ventricular septum. The final cause of death was determined to be severe coronary atherosclerosis with thrombosis and acute myocardial infarction. The cessation of his Clopidogrel likely caused the thrombus formation leading to a myocardial infarction and sudden death. This presentation of late stent thrombus formation following the cessation of antiplatelet medications leading to sudden death is a rare complication of drug eluting stents.

#### **P48 Sudden Death: Hypokalemia and Cardiac Arrhythmia Secondary to Conn's Syndrome**

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Sudden death secondary to Conn's syndrome is exceptionally rare, with limited cases reported in the literature. The triad of Conn's syndrome (hypertension, hypokalemia, and hyperaldosteronism) triggers a negative feedback cascade, resulting in dangerous electrolyte abnormalities leading to potentially life threatening arrhythmias. This is a rare case of sudden death secondary to Conn's Syndrome. The decedent was a 33-year-old, 14-week pregnant female who suddenly lost consciousness while driving, hitting another vehicle causing minimal damage. Upon EMS arrival, she was found to be in ventricular fibrillation. ACLS with intubation was initiated and ROSC obtained after 7-8 minutes before she fell into PEA arrest. ACLS was continued in transit and, upon arrival to the emergency department, ROSC was obtained while she remained unresponsive. Labs were significant for hypokalemia (2.3 mmol/L) and severe acidosis (pH 6.95); both were aggressively corrected along with targeted temperature management. Obstetric ultrasound confirmed a 14week gestation without evidence of abruption. Echocardiogram showed septal hypokinesis and decreased left ventricular function in the setting of post-resuscitation. Additional imaging was negative for pericardial or intraabdominal fluid as well as pulmonary embolism or dissection. Computed tomography of the head showed evidence of anoxic brain injury. Repeat MRI revealed no intracranial blood flow, and with continued poor neurologic status, the patient was pronounced brain dead. Family requested an autopsy which revealed a 1.2 cm adrenal adenoma, cardiomegaly, left ventricular hypertrophy, pulmonary edema, and hepatomegaly. Histological evaluation of the adrenal adenoma showed a well demarcated tumor with clear, vacuolated cells. The adrenal adenoma is believed to be functional and the underlying cause of the decedent's electrolyte abnormalities and ultimately death.

#### **P49 WITHDRAWN**

#### **P50 A Summary of Time Spent During One-Hundred Consecutive Courtroom Testimonies**

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Providing courtroom testimony is one of the many responsibilities of a forensic pathologist. The time spent traveling to and from the courthouse

and the time the pathologist may have to wait upon arrival at the courthouse and before actually testifying can be a significant amount and strain in an already busy forensic pathologist's schedule. The author recognized these time demands early in his career. To better document the additional time demands that in person courtroom testimony adds to a forensic pathologist's responsibilities, the author documented 100 consecutive in person trial testimony experiences during the previous 10 years. Specific events documented were number of days between date of death and trial testimony, cause of death and manner of death of each trial testimony, and time spent on the day of trial subdivided into travel time, idle time waiting prior to testimony, and actual time on the witness stand. Other time-related variables the author was unable to document were the time spent during the autopsy, the time used for preparation and completion of the autopsy report, and the time utilized preparing for court appearance. This presentation will summarize approximately one-half of one forensic pathologist's experiences providing in person courtroom testimony and will highlight time ranges and averages of how much additional time is involved in addition to the actual time spent on the witness stand. Although the author has experiences with virtual depositions but not with virtual trial testimony, the potential time savings that virtual trial testimony may benefit a forensic pathologist by potentially eliminating travel time and idle waiting time encountered during in person courtroom testimony is significant.

#### **P51 Rare Fatal Mycoplasma Pneumonia-Associated Encephalopathy in a Previously Healthy Adolescent: Case Report**

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We report a rare death from hypoxic ischemic encephalopathy in association with *Mycoplasma pneumoniae* respiratory infection in a previously healthy 17-year-old female with no significant medical history except for well-controlled asthma and obesity (BMI 36 kg/m<sup>2</sup>). Following a five-day course of headaches and vomiting at home, she was found in bed with posturing concerning for seizure activity and was taken by EMS to the Emergency Department (ED).

Upon arrival in the ED, she was unresponsive and was intubated. A rapid SARS-CoV-2 antigen test was negative. Initial labs revealed mild anemia (Hgb 9.6) and elevated anion gap acidosis including elevated lactate. She was afebrile. Head CT was negative for intracranial hemorrhage, but later radiologic interpretation showed a possible acute ischemic left MCA stroke. She was treated empirically for bacterial meningitis with vancomycin and ceftriaxone. Cerebrospinal fluid studies following lumbar puncture showed leukocytosis (51% lymphocytes, 44% macrophages) with elevated protein concerning for viral meningitis; hence, acyclovir was added.

Magnetic resonance imaging of the brain on hospital day three revealed findings consistent with hypoxic ischemic encephalopathy including diffuse cerebral edema and uncal and tonsillar herniation. Due to lack of improvement in neurological status and confirmation of brain death, she was pronounced deceased on hospital day three.

Other pre-mortem laboratory studies including respiratory viral panel, repeat SARS-CoV-2 testing and extensive encephalitis panel were all negative. Of note, serologic workup was positive for *Mycoplasma pneumoniae* IgM and IgG (results returned after death).

An autopsy was performed. Significant anatomic findings included bilateral pleural effusions and marked cerebral edema including uncal and tonsillar herniation. Meninges were colorless and transparent. Microscopic sections of the brain showed global ischemic changes with scattered eosinophilic neurons and extensive white matter edema but no inflammation or other evidence of meningitis or encephalitis. There was no gross or microscopic evidence of stroke. Sections of lung revealed features of acute pneumonia including collections of neutrophils in alveolar spaces and associated

interstitial lymphocytic inflammation. No histologic features of acute or chronic asthma were identified.

This case highlights a rare case of fatal global ischemic encephalopathy in association with *Mycoplasma pneumoniae* infection in a previously healthy adolescent. Clinically, *Mycoplasma pneumoniae* is most frequently an indolent disease, the incidence of which is difficult to estimate as these infections are often subclinical or mild and therefore remain undiagnosed. Clinically recognized central nervous system complications of *Mycoplasma pneumoniae* infection including encephalitis, stroke, Guillain-Barre syndrome and acute disseminated encephalomyelitis were not present in this case.

#### **P52 The Impact of COVID-19 on the Illicit Drug Related Deaths in the State of Maryland**

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As of March 5, 2021, the 2019 novel coronavirus disease (COVID-19) has caused 2,560,995 deaths worldwide including 533,641 deaths in the United States. While the rising number of COVID-19 deaths have been the news headlines since last year, illicit drug overdose deaths have become another national crisis during the pandemic. The study was to compare the trend and pattern of illicit drug deaths between 2019 and 2020 in Maryland and to evaluate the impact of COVID-19 on the illicit drug related deaths. The Office of the Chief Medical Examiner (OCME) is responsible for medicolegal death investigation of all the non-natural deaths including drug overdose deaths. A retrospective review of all deaths investigated by OCME revealed that there was a 13% increase in illicit drug deaths in Maryland from 2019 to 2020 (N=2268 vs N=2608). More males than females and more African-Americans than the other racial groups died of illicit drug overdose based the death rate per 100,000 population. The average number of illicit drug deaths was 189 cases/month in 2019, 206 cases/month prior to pandemic (Jan-March, 2020), a slight drop in April 189 cases during the stay-at-home period, and significant increase 225 cases/month from May to December, 2020. Fentanyl/fentanyl mixed with other drugs (N=1905 in 2019; N=2298 in 2020, a 17% increase) were the leading cause of illicit drug death, followed by cocaine and heroin/morphine. There was 32% increase in methadone related deaths in Maryland in 2020. Our study showed that COVID-19 pandemic has accelerated overdose deaths in Maryland.

#### **P53 Shocking Figures: A Series of Fatal Electrocutions Due to Fractal Wood Burning**

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Pyrography – burning designs into materials such as wood – has been a long-practiced art. Fractal wood burning is a modern pyrography technique that involves painting an electrically conductive solution onto wood and applying high-voltage electricity via probes to create branched designs, or Lichtenberg figures. Instructional videos can be found across the internet, empowering hobbyist woodworkers with the skills necessary to create these designs by using household items such as such as baking soda and microwave transformers. The dangers of working with high-voltage electricity from the comfort of one's own home has obvious risks and despite increasing awareness as to the dangers of fractal wood burning, electrocutions while performing the activity remain prevalent. Within a six-month period, the Iowa Office of the State Medical Examiner investigated three fractal wood burning-related deaths. All three decedents were male, between the ages of 40 and 70, and familiar with fractal wood burning. Autopsy findings included severe electrical burns to the hands, with partial

amputation of a digit in one case. Two decedents had obvious electrical burns to the chest. One decedent caught fire after he was electrocuted, leading to burns of approximately 95% of his total body surface area – carbon monoxide testing and examination of the airways revealed he was dead at the time of the fire. One death was witnessed, with reports of an electric arc forming between the two probes the decedent was holding. In all three cases, cause and manner of death were certified as electrocution and accident, respectively. In spite of warnings from woodworking associations and online hobbyists, fractal wood burning remains popular. While the cause of death may appear obvious, a thorough scene investigation is necessary to associate injuries with fractal wood burning. Increased documentation of deaths relating to this activity may encourage enhanced prevention efforts and proper education for those looking to pyrography with potential interest.

#### **P54 The Value of the Postmortem Urine Drug Screen as an AIDE in Determining the Cause of Death**

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Drug-related deaths are a major concern to the forensic science community, especially during the pandemic. Toxicology analysis of postmortem samples can be costly and delay completion of the autopsy report and death certificate. Urine drug screens (UDS) have helped alleviate some of these issues.

UDS testing performed by medical examiners for suspected drug-related deaths can be extremely valuable for insight into the possible cause of death. However, concern has emerged over the accuracy and reliability of the urine drug screen compared to full analysis performed at a toxicology laboratory.

There is no question that a comprehensive toxicological analysis provides a more thorough insight into recent drug usage by the decedent, but is there an appropriate role for the urine drug screen? If so, what are its limitations and which brand of urine drug screens are most accurate?

Objectives: To analyze the accuracy of the Premier Biotech UDS (Bio-Dip) compared to another UDS brand and to confirmatory analysis by NMS Laboratories. Also, to determine the number, type, and trend of discordant results.

Impact: Provide insight into the reliability and limitations of the Premier Bio-Dip, and help medical examiners efficiently cope with the growing number of examinations.

Initial data: Bio-Dip results for amphetamines (AMP), buprenorphine (BUP), benzodiazepines (BZO), cocaine (COC), fentanyl (FYL), methamphetamine (MET), methadone (MTD), opiates (OPI), oxycodone (OXY), and tramadol (TML) compared to confirmatory analysis by NMS Laboratories. Additionally, results for the Alere iCup DX (Towler 2020) are in bold.

Sensitivity/specificity/accuracy:

Amphetamine: 92.3/98.8/97.9, **93.1/100/97.9**

Buprenorphine: 100/90.1/90.1, **66.7/100/98.9**

Benzodiazepines: 75.4/97.8/91.1, **83.3/89.0/88.4**

Cocaine: 97.3/95.0/95.8, **92.2/99.2/96.8**

Fentanyl: 79.0/97.1/85.4, **not reported**

Methamphetamine: 97.2/96.2/96.4, **92.4/98.4/96.3**

Methadone: 100/99.5/99.5, **100/100/100**

Opiates: 88.9/98.6/95.8, **not reported**

Oxycodone: 90.0/97.5/96.4, **88.2/98.1/96.3**

Tramadol: (n/a)/96.4/96.4, **not reported**

Conclusion: Neither UDS test held a significant advantage over the other. Moreover, neither test displayed 100% reliability in comparison to the confirmatory tests used in each study. Therefore, we suggest these UDS test be used to guide further evaluation by confirmatory testing and not as a definitive diagnostic tool to determine the cause of death.

#### **P55 Snowcapitation: Near-Decapitation by Snow Plow**

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We present the case of a 58-year-old man who was killed on a snowy February afternoon. The decedent was travelling southbound on a highway when a public works truck crossed over the median and collided with him. The public works truck contained an ice scraper blade that entered into the decedent's vehicle, ultimately resulting in a near decapitation. An external examination was performed at the Boone/Callaway County Medical Examiner's Office.

The body was that of a well-developed, well-nourished male whose appearance was consistent with the given age of 58 years of age. The length of the body, from the bottom of the feet to the top of the head, was 5 feet and 9 inches. The weight was 221 pounds. Rigor mortis was completely developed and livor mortis, with an appropriate pattern, was posterior and fixed. There were no signs of decomposition. There were hemorrhages of the right eye and the right eye was depressed. The teeth were multiply fractured along with a jaw fracture. There were no petechiae of the conjunctivae or sclerae.

There were extensive blunt force injuries to the body. There was a near-decapitation with nearly all anterior and posterior neck organs markedly disrupted and partially absent with bilateral fractures of the clavicle in a 35 x 10 -centimeter area. The head and neck were only held on to the body by the posterior skin. There were abrasions and lacerations of the left side of the face, palpable left jaw fractures, and a fracture of the right ulna.

Toxicology was performed and was positive for caffeine, indicating that the decedent was not impaired at the time of driving. The medical examiner determined the cause of death was blunt force injuries of the head and neck due to a motor vehicle collision. The manner of death was ruled accidental.

#### **P56 WITHDRAWN**

#### **P57 WITHDRAWN**

#### **P58 Postmortem Animal Predation of Human Genitalia: A Unique Case Presentation**

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Introduction: Postmortem animal predation is a fairly common occurrence and may be seen when a deceased individual is exposed to vermin, such as rats, aquatic fauna (fish and crustaceans), carnivorous forest animals, animals that feed on carrion, and household pets such as cats, dogs and large reptiles. In the majority of instances of postmortem predation, the feeding animals would begin predation on the exposed softer portions of the body such as the face (lips, nose, ears, chin), fingers, and neck. When postmortem animal predation involves household pets (dogs and cats) the presumption is that the animal will begin to feed on the decedent when hunger sets in. We present a case of isolated postmortem predation of the genitalia in an adult male with diabetes.

**Case Report:** The decedent was a 52-year-old male who was found supine, deceased on the floor of the living room of his residence. He was reported last known alive two days earlier walking his pet dog, which was a large breed pup that was approximately three months old. The decedent had a medical history of hypertension, coronary artery disease, and diabetes. The scene revealed scattered white fragments of a diaper throughout the living room. The body was nude and the penis and portions of the scrotum was absent. The skin and subcutaneous tissue where the penis was located had jagged edges with no blood staining or drainage. The floor under the decedent had blood staining. The face and extremities were intact and had no finding of postmortem animal predation. The internal examination revealed severe coronary atherosclerosis and hypertensive changes in the heart. The urinary bladder was distended with 1000 ml of cloudy urine. Vitreous glucose level was 293 mg/dL and ketones (beta hydroxybutyrate) was 11.38 mmol/L. The death was certified as hypertensive and atherosclerotic cardiovascular disease with diabetes mellitus listed as a contributing factor. The manner of death certified as natural.

**Conclusion:** This case was unique in that while the face of the decedent was easily accessible to the dog, we believe that the dog was attracted to the sweet odor or taste of the glucosuria in the diaper, which explains the scattered fragments of disposable diaper in the residence. After the diaper was destroyed the dog then proceeded to consume the genitalia.

#### **P59 A Hidden Murder by Poisoning: Toxicology Investigation on a Buried Corpse**

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Postmortem toxicology investigates the role of exogenous substances in determining or contributing to death. Postmortem changes must always be considered: formation of new molecules, as well as degradation of drugs may occur, especially in putrefied corpses. Body fluids and tissues may be severely affected by postmortem phenomena, so much that just the latter could be available for testing.

The authors report a case of a ninety-one years-old woman deceased apparently of natural causes. Three years after death, the son confessed to murdering her by administering benzodiazepines (BDZs) and later suffocating her. The prosecutor required the autopsy to verify the truthfulness of this unexpected admission. The victim was exhumed after 1,068 days of burial in a zinc coffin. The corpse showed signs of corification: the skin was yellowish, supple and soft like 'freshly tanned leather', draping and emphasizing the underlying skeleton. This form of cadaveric decomposition did not allow to identify signs of suffocation at external examination. Internal organs were reasonably well-preserved. Specimens of hair and main tissues (brain, lung, heart, liver, gallbladder, spleen, kidney, psoas major muscle, stomach, bone marrow from iliac crest) were gathered and stored at -20°C.

The collected samples of tissues and hair were processed to extract xenobiotic substances, including BDZs and their metabolites. Screening and quantitative analysis of the target molecules were performed by high performance liquid chromatography-high resolution mass spectrometry (HPLC-HRMS) and high-performance liquid chromatography tandem mass spectrometry (HPLC-MS/MS). The tests showed: lorazepam 2.5 ng/gr (spleen), diazepam 17 ng/gr (stomach), diazepam 4.7 ng/gr (bone marrow), 7-aminoNitrazepam 5.9 ng/gr (gallbladder).

In consideration of the long time between death and the autopsy, and the poor stability of BDZs in cadaveric tissues due to postmortem factors (i.e., temperature, bacterial metabolism), the concentration of the detected BDZs was extremely high when death occurred.

The evidence of BDZs in the gastric tissue demonstrated an intake shortly before death. The finding of BDZs in spleen, bone marrow and gallbladder proved that their absorption and distribution took place before death. The absence of these drugs in the hair is consistent with the reported occasional intake for anxiety in the last months of her life. Therefore, the toxicological investigation confirmed the credibility of the confession of the offender, who was eventually prosecuted for homicide.

In conclusion, this report highlights the importance of forensic toxicology in establishing the causes of death even after years from the events, also in cases of apparently natural causes.

#### **P60 Stillbirth Due to Umbilical Cord Hematoma**

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Umbilical cord Hematoma (UCH) is a life-threatening complication of pregnancy, although extremely rare. It can lead to fetal distress and stillbirth. The UCH occurs due to rupture of the umbilical vein, or, less frequently, of the umbilical artery. The etiology of UCH still remains unexplained. Risk factors for UCH include morphologic anomalies of the umbilical cord (length or thickness of the vessel wall), true knots, cord prolapse, traction or shortness of the cord, infection (i.e., chorioamnionitis, funisitis), postmaturity, mechanical trauma between fetal and maternal tissue. Fetal death or hypoxia may be caused by complete or partial compression of umbilical vessels by the blood extravasation in Wharton's jelly.

The authors report a peculiar case of UCH. A 32-year-old pregnant woman was conducted by ambulance in emergency because of premature rupture of membrane (PROM) at 39 weeks gestational age. Her past medical history was silent. At emergency department arrival, fetal cardiotocography (CTG) was unremarkable. At delivery, the following data were registered: weight 3,280 g; nonreactivity to stimuli and cyanosis; APGAR score was 0/0; pH 6.593. The fetus did not spontaneously breath and was promptly ventilated and transferred to pediatric intensive care unit. After almost one hour of cardiopulmonary resuscitation, the unborn was declared dead.

An autopsy was performed to clarify the cause of stillbirth, and to investigate about medical malpractice claims. The external examination showed cyanosis, dark purple hypostasis, and meconium on gluteus skin. At internal examination, petechiae were observed on the surface of the lungs. No congenital malformations were identified.

The placenta weighed 450 g and the umbilical cord measured 34 cm. At macroscopic examination, umbilical cord was abnormal, with dark red discoloration and markedly increased thickness. Hystopathological examination confirmed the presence of three hematomas. The tract of cord affected by the hematoma showed perivascular hemorrhagic infiltration, umbilical vessels compressed by the hemorrhagic effusion, and fissures of the arterious wall. The hystological examination of the placenta showed marked hypertrophy of stem villi, probably due to gestational hypertension.

In conclusion, the pathologists signed as cause of stillbirth the UCH, suggesting a role of the gestational hypertension and the umbilical cord shortness. Medical malpractice claims were excluded because at hospital admission there were not alterations of the CTG and/or other signs that could have been indicative of fetal distress.

### **P61 Fatal Malignant Hyperthermia During Surgery: Then and Now**

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We present a case of an 18-year-old healthy woman undergoing elective breast augmentation at an outpatient facility in the Spring of 2008. Approximately 90 minutes into the procedure, she was complicated by malignant hyperthermia requiring resuscitation, dantrolene administration, and transfer to a hospital for escalation of care. Surgical notes and admission notes document her temperature at 108 degrees Fahrenheit. Despite medical interventions, she had multiorgan failure and was pronounced approximately 24 hours after initial event. Of note, the patient's mother had the same procedure one week prior without complications.

The gold standard for susceptibility to malignant hyperthermia testing is a muscle biopsy followed by an *in vitro* caffeine halothane contracture test, and this testing became available in the United States in the early 2000's. Consultation with the Malignant Hyperthermia Society hotline procured a referral to the University of Pittsburgh, and submission of frozen muscle for testing and genetic testing. The decedent was positive for a mutation of the 45th coding exon of the ryanodine receptor (RYR1), which is located in chromosome 19q13.1.

Malignant hyperthermia is a hypermetabolic crisis induced by exposure to anesthesia, which clinically presents as hyperthermia, muscle rigidity, rhabdomyolysis, tachypnea, tachycardia, and rise of end tidal carbon dioxide. It is a result of abnormal calcium release from the sarcoplasmic reticulum. It is transmitted in autosomal dominant fashion and has been associated to mutations in two genes, *RYR1*, which encodes the calcium release channel of the sarcoplasmic reticulum and *CACNA1S*, which encodes the alpha-subunit of the voltage dependent L-type calcium channel of the transverse tubule. Products of these genes are key in maintaining calcium homeostasis in skeletal muscle and play key roles in excitation-contraction coupling. Since 2008, advances in genetic testing have shown multiple genetic variants that clinically present as malignant hyperthermia, either associated to the *RYR1* gene or the *CACNA1S* gene.

### **P62 WITHDRAWN**

### **P63 Not To Be Outdone: The Persistence of Overdose-Related Deaths During the COVID-19 Pandemic in Maryland, Trends From 2019 to 2021**

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Per the Centers for Disease Control and Prevention (CDC), overdose-related deaths have steadily increased in the United States since 1999, reaching 70,630 deaths in 2019. Opioids are the most common cause of overdose deaths, comprising 70.6% of all overdose deaths in 2019. Furthermore, polysubstance overdose-related deaths, defined as a death due to exposure to more than one drug, are more common than before. In March 2020, the United States faced another significant challenge, the Covid-19 pandemic, which necessitated extensive restrictions on daily activities, leading to financial and mental hardship and a subsequent increase in anxiety, social isolation, and depression. Nationwide data and provisional statistics provided by the CDC suggest a greater than expected overall increase in overdose-related deaths that coincides with the beginning of the pandemic.

The Maryland OCME records were searched for cases from March 1, 2019 to February 28, 2021 for overdose-related deaths. Included were all cases in which autopsy, partial autopsy, in-house inspection with toxicology

testing, or CT autopsy with toxicology testing was performed. Cases from March 1, 2019 to February 29, 2020 were designated as the control group and consisted of 2 351 overdose-related deaths (out of 6,012 total; 39.1%), with decedents ranging in age from nine-months-eight-days to 96 years old. Cases from March 1, 2020 to February 28, 2021 were designated as the study group and consisted of 2 655 overdose-related deaths (out of 6,598; 40.2%) with decedents ranging in age from 2 months 23 days to 86 years old.

Our findings support the reports published by the CDC and show an increase in complexity of overdose-related deaths. Within the control group, 1 848 (78.6%) deaths were attributed to polysubstance intoxication; of these, 600 (32.5%) involved only opioids, and 1,248 (67.5%) involved more than one class of drug. The remaining 21.4% of cases involved single drugs. In our study group, 2 174 (81.9 % of total) deaths were attributed to polysubstance intoxication; of these, 613 (28.2%) involved only opioids, and 1 563 (71.9%) involved more than one class of drug. The remaining 18.1% of cases involved single drugs. These findings are further supported by analysis of toxicology testing data showing that in 2019, 4.5 drugs were reported per case on average, and in 2020, 5.1 drugs were reported per case on average, reflecting an increase in complexity. Only time will tell if this is a sustained upward trend, or an indirect effect of the pandemic.

### **P64 SUID Tissue Consortium: Advancing Medical Research through Postmortem Tissue Donation**

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**Introduction:** Advanced scientific research on sleep-related infant deaths has slowed over the years due to the shortage of postmortem tissue. While pathology findings and epidemiological patterns of these deaths have led to public health interventions, science-based research using postmortem tissue has also shown great potential in addressing some genetic and physiological abnormalities surrounding these unexpected infant deaths. To further enhance the knowledge of these abnormalities, the American SIDS Institute (ASI) launched the sudden unexpected infant death (SUID) Tissue Consortium to systematically collect tissue from deceased children less than four years of age and safely bank for researchers.

**Methods:** ASI has collaborated with University of Maryland Brain and Tissue Bank (UMD BTB) which is an NIH NeuroBioBank, as well as seven Medical Examiner (ME) districts and six Tissue Donor Services in Florida, Georgia, Minnesota, and Ohio. Trained professionals at the local Tissue Donor Services or UMD BTB approach parents and explain the purpose of the SUID research to obtain consent. To preserve the quality of the tissue, consent must be obtained, and tissue collected at autopsy within 48 hours of death. Tissue from non-sleep related deaths like drowning or motor vehicle accidents are also collected to be used as controls. The tissue is then fixed or frozen at -80 degrees and shipped overnight to UMD BTB to be banked.

**Results:** Since 2011, autopsy and scene investigation data on over 1 300 cases have been recorded. There have been 104 consented cases with the cause of death classified as follows: SIDS, SUID or undetermined causes (25%), suffocation, asphyxia, or overlay (28%), illness or medical condition (21%) and motor vehicle accident, injury, or hyperthermia (25%). The challenge of reaching new grieving parents to obtain consent has significantly contributed to fewer consented cases. We have been able to contact families and obtain consent on about 7% of eligible infants and toddlers. Of those parents who we successfully reach, about 18% consent to having their child's tissue used for research.

**Conclusion:** Although this program has been successful in banking tissue of 104 SUID infants and controls, more tissue is still needed for academic

researchers. American SIDS Institute annually funds several two-year grants to support SUID research and welcomes proposals from researchers who could use the Tissue Consortium database and banked tissue to advance research in this field.

#### P65 WITHDRAWN

##### P66 A Rare Death Due to Bone Marrow Embolism

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Deaths due to bone marrow embolism are rare occurrences characterized by the presence of immature and mature erythrocytic and myeloid cells, mature fat cells, and megakaryocytes in the circulatory system. Bone marrow embolism commonly occurs following events such as bone trauma or external cardiac massage, and it can involve organs such as the lungs, central nervous system, skin, and kidneys. Currently, there is very limited literature on bone marrow embolism. A presumptive diagnosis of bone marrow embolism may be challenging due to its obscure clinical presentation with possible multiorgan involvement. The diagnostic step is further complicated by laboratory and radiological findings that are not always indicative. Usually, a definitive diagnosis, therefore, is established with histopathological analysis of postmortem lung tissue.

We herein report the case of a 45-year-old Caucasian male with a past medical history of illicit drug abuse, cauda equina syndrome, flaccid quadriplegia requiring wheelchair use since 2015 who was found delirious and in acute distress in his bedroom by his roommate. He was transferred to the emergency department of the local hospital. On physical examination, fever (>38 C), severe respiratory distress (SpO<sub>2</sub> <90%) despite continuing ventilation, and hyperemia of the upper third of the right thigh were observed. A total body computed tomography scan showed a displaced pertrochanteric femoral fracture. Shortly after the admission, the subject sustained an episode of cardiac arrest and died suddenly. No cardiopulmonary resuscitation was performed. Blood cultures and toxicology tests were performed on the blood obtained at the time of admission and came back negative for bloodstream infection and drugs after the autopsy examination.

The autopsy revealed multiple stage III/IV pressure ulcers, a pertrochanteric displaced femoral fracture in the right leg with surrounding dark brown to black soft tissue hemorrhage, and multiorgan congestion. Histopathological examination of postmortem lung tissue samples revealed widespread bone marrow embolisms in the small pulmonary vessels. Death was due to respiratory failure due to diffuse bone marrow embolism.

This case report highlights a very rare cause of death and may contribute to the currently limited literature on bone marrow embolism. Further research is needed to better understand bone marrow embolism's pathophysiology to improve diagnosis, management, and treatment of this rare condition.

##### P68 Adult Onset of Ornithine Transcarbamylase Deficiency: A Rare Medical Examiner Case

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Ornithine Transcarbamylase (OTC) is one of the most critical enzymes of the urea cycle that converts ammonia into urea in the mitochondria of liver

cells. OTC plays a crucial role in the breakdown and removal of nitrogen in the body. OTC deficiency is a rare X-linked recessive genetic disorder that classically presents in early life with signs of hyperammonemia and progressing central nervous system involvement resulting in seizures, coma, and death. Sentinel presentations in adulthood are very rare.

We present the case of a 29-year-old decedent white male with a recent history of epidural steroid injection for chronic back pain. Soon after the injection, he developed altered mental status and presented to the emergency department with severe agitation requiring ketamine. Blood testing was performed, but the patient refused admission and was discharged. The ammonia level detected after discharge was 125 µmol/L. The following day, he developed altered mentation followed by seizures and was transported to another emergency department. His seizures persisted and he was subsequently intubated. Labs were remarkable for an ammonia level of 591 µmol/L. He was admitted, and his condition progressively deteriorated. He developed worsening hyperammonemia with levels rising to greater than 700 µmol/L; subsequently, he developed encephalopathy with diffuse cerebral edema. Despite supportive management, he was pronounced brain dead two days after admission. Lab analyses performed in the hospital detected amino acids in blood and urine. Together with profound hyperammonemia, transaminitis, and central nervous system dysfunction, these findings led to the diagnostic suspicion of undiagnosed OTC enzyme deficiency/urea cycle disorder.

The case was referred to the Medical Examiner Office. The autopsy examination was unremarkable, except for the liver that showed a diffuse yellow discoloration and abnormal softening of the parenchyma. Histology and electron microscopy of the liver and genetic analysis confirmed an OTC deficiency.

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hen suspecting a potential genetic disorder at autopsy, an attempt to identify the specific genetic abnormality should be made. A genetic mutation identified in the deceased allows for directed genetic testing in the surviving family members. Since some of these conditions are treatable, testing the family members for the detected genetic disorder can prevent possible life-threatening episodes. However, even if a suspected genetic disorder cannot be confirmed, counseling the family to follow up with their physicians for potential clinical testing of survivors is strongly advised. Timely intervention may prevent future illness or loss of life.

##### P69 The Opioid Epidemic and Trends in Cook County During the COVID Pandemic.

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While the COVID-19 pandemic is affecting all the countries worldwide, the United States is facing an unprecedented opioid epidemic. An increase in opioid-involved overdose deaths has been observed in Cook County in recent months. In response to the COVID-19 pandemic, Illinois enacted a stay-at-home order on March 21, 2020.

Before the pandemic, Cook County, Illinois, had already experienced 2 years of high levels of opioid-involved overdose deaths. However, an unexpected increase in overdose deaths has been observed beginning in late 2019 and early 2020.

Data from the Cook County Medical Examiner's Office Case Archive, including deaths with opioid involvement occurring during January 1, 2018–April, 2021, were reviewed. Forensic pathologists make causes of death

determinations at the Cook County Medical Examiner's office. Only cases in which a full autopsy and toxicology was performed were included in the study.

Results showed a remarkable increase of cases during the pandemic, especially in the stay-at-home order compared to the period before and after the order. A thorough discussion of the result will be presented to the attendees.

The alarming increase of overdose deaths in Cook County during the stay-at-home order could be due to several reasons, including disrupted treatment services delivery, social isolation, and unavailability of constant opioid supplies. It results in an increased risk of overdose and discontinuous opioid use and potential loss of drug tolerance or replacement with more powerful and dangerous opioids, such as fentanyl. The global COVID-19 pandemic exacerbated the negative health outcomes associated with the concurrent opioid overdose crisis in North America, bringing unprecedented challenges for opioid users and practitioners who provide opioid use disorder care. The emerging trends of increased opioid overdose in Cook County provide empirical evidence for concerns that opioid overdoses are rising during the current COVID-19 pandemic.

As the COVID-19 pandemic continues, there is the need for novel strategies to mitigate indoor overdose risks to prevent further harm to those most vulnerable to opioid-related injury and death while also addressing COVID-19 risks.

#### **P70 Do Economic Impact Payments Impact Drug Deaths?**

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The COVID-19 pandemic has had a significant economic impact on the citizens of the United States, causing a record quarterly drop in economic output of 9.1 percent in the second quarter of 2020. Unemployment rates have spiked as a result of the pandemic, and this strain on the daily lives of citizens has been anecdotally linked to higher rates of accidental and intentional drug overdoses. The issuance of Economic Impact Payments ("Stimulus Checks", EIPs) have also been anecdotally linked to temporal spikes in the rates of drug overdoses. We aimed to discover if this anecdotal information is reflected in the drug overdose data for Palm Beach County (PBC).

We examined the rates of accidental and intentional overdoses spanning two months before the issuance of each of the three EIPs by the federal government, and compared that data to a baseline overdose rate from calendar year 2017 (the baseline year for drug deaths in PBC).

In 2017, the PBC Medical Examiner's Office saw 818 deaths due to drug overdoses out of a total of 2134 cases (26.18%). Of those drug overdose cases, 626 were due at least in part to opiates (76.5%). In the timeframe examined for the relationship between drug overdose deaths and the issuance of EIPs, the PBC Medical Examiner's Office saw 794 deaths due to drug overdoses out of a total of 4176 cases (19.01%). Of those drug overdose cases, 609 were due at least in part to opiates (76.7%).

Economic Impact Payments were issued around April 13<sup>th</sup>, 2020, December 30<sup>th</sup>, 2020, and March 18<sup>th</sup>, 2021. Preliminary data indicates that for the two months prior to April 13<sup>th</sup>, 2020, the average number of drug deaths in PBC was 13.5 per week, and for the two months after April 13<sup>th</sup>, 2020, the average number of drug deaths in PBC was 15.7 per week. For the two months prior to December 30<sup>th</sup>, 2020, the average number of drug deaths in PBC was 10 per week, and for the two months after December 30<sup>th</sup>, 2020, the average number of drug deaths in PBC was 8.42 per week.

There does not seem to be a correlation between the issuance of EIPs and drug deaths in PBC. It is likely that the anecdotal data regarding this issue is due more to a hyper-awareness of drug deaths after the issuance of each EIP than due to any real data on the subject.

#### **P71 Sars-CoV-2 (COVID-19) Experience at an Academic Medical Examiners Office**

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The coronavirus pandemic caused by Sars-CoV-2, also known as COVID-19, has resulted in considerable worldwide public health concerns during the past year-plus. In the United States, most of the lethal COVID-19 cases are identified and attended to within the clinical healthcare arena, without necessarily requiring medical examiner/coroner (ME/C) investigation or involvement. Although certain ME/C offices have chosen to (or perhaps are obligated by statute to) investigate all COVID-19 cases, within many US jurisdictions, the cases are considered natural, infectious disease-related deaths requiring no further ME/C involvement. Despite this fact, because of the nature of the virus, it is inevitable that certain COVID-19 cases will necessitate ME/C investigation. In this presentation, we present an academic medical examiners office experience with Sars-CoV-2 cases.

While some ME/C offices within the US have the ability to perform COVID-19 polymerase chain reaction (PCR) swab testing on all bodies, due to limited resources, the investigating office in this report has had to be selective as to which cases are tested in this manner. If a death is suspected of involving COVID-19, nasopharyngeal swabs are collected and tested via PCR through the county health departments. In certain cases which are autopsied, additional lung swabs may be collected and tested. An immunohistochemistry (IHC) stain specific for Sars-CoV-2 is available within the histology laboratory. In addition, serum collected at autopsy may be tested for antibodies specific for the COVID-19 virus.

In this presentation, an overview of an academic medical examiner office's experience with COVID-19 cases will be presented. The review will include non-autopsied cases, such as presumed COVID-19 deaths investigated during cremation permit review and natural deaths released directly from the scene to funeral homes, as well as cases in which autopsies were performed and COVID-19 swabs were collected because of a concern for possible infection. Examples of case types presented will include "classic" respiratory system-related COVID-19 deaths, deaths where COVID-19 played a contributory role, and cases where COVID-positivity was considered incidental. Also presented will be select cases where anxiety about COVID-19 may have been contributory to death.

#### **P72 Death Due to Colon Laceration Following Self-Sodomy: A Case Report**

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Autoerotic deaths are defined as accidental deaths that occur during individual, usually solitary, sexual activity in which some type of apparatus used to enhance sexual stimulation of the decedent causes unintentional death. The incidence of autoerotic deaths is widely cited in the literature as around 500 to 1 000 deaths per year in the United States. Sodomy can be defined as a practice to increase sexual gratification by anal or oral penetration. Foreign body insertion is often used in autoerotic practice as a

means to enhance sexual pleasure. In rare cases, these autoerotic manipulations may cause immediate (due to acute hemorrhage) or delayed deaths (usually due to an infectious process secondary to the presence of a trapped foreign body or perforation of a hollow viscus).

We report the case of a 43-year-old white male with a history of illicit drug use who was recently released from prison. Five days after, he was found unresponsive in his residence, seated on a kitchen chair. Drug paraphernalia was present on the scene, but there was no evidence of foul play, suicide notes, or prescribed medications.

Autopsy examination revealed a partially soiled hand towel in the underwear of the decedent and a blue-red contusion in the perianal area. Internally, there were two mucosal lacerations of the rectum, 4.5 cm from the anal verge. Additionally, a transmural laceration of the anterior wall of the colon at the recto-sigmoid junction was identified. This was associated with a collection of brown fluid in the peritoneal cavity and evidence of peritonitis. Microscopy of the colon samples confirmed hemorrhage, fibrin, and acute inflammation, consistent with recent perforation. Toxicology was positive for cotinine, amphetamine, and methamphetamine. Given the decedent's recent incarceration, the autopsy findings were concerning for criminal sodomy. However, law enforcement identified multiple shampoo bottles stained by fecal material wrapped in a blanket at the decedent's residence. Therefore, the death was ascribed to peritonitis due to blunt force anorectal trauma. The manner was classified as accidental.

Accidental deaths resulting from delayed complications of self-sodomy are rarely reported in the literature. Delayed autoerotic deaths may be challenging and require a thorough investigation to establish an accurate manner of death. A detailed discussion of the case, including scene and autopsy findings and images is presented.

### **P73 Texas Mike and the Snitch**

*C.H. Schoppe<sup>1</sup>*

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Decomposed and burned bodies present obvious difficulties in the identification of antemortem trauma. Even when trauma is obvious, despite the effects of decomposition and burning, the determination of the type and number of wounds can be challenging. In busy offices, where there is pressure to perform all autopsies quickly, a bias toward common things being common may result in overconfidence in diagnosis, whereas lack of confidence and fear of overcalling artifactual wounds can result in uncertainty as to the cause of injuries and the manner of death. Both scenarios may result in prosecutorial mismanagement.

Postmortem radiology is extremely useful, particularly when projectiles or foreign bodies, and/or skeletal injuries are identified. But what to do with a burned and decomposed body, found outside near a lake, with obvious blunt trauma of the face, trunk, and extremities, a foam cone, two externally typical-appearing gunshot entrances wounds to the head, and no projectiles, projectile fragments, or intracranial bone fragments on postmortem radiographs? During this presentation, I will discuss a case with all of the above, and present alternative mechanisms of injury and injury mimics that may confound the accurate identification of injury type and mechanism.

Oh, did I mention that body was also covered in melted plastic that had re-hardened? And was commingled with dismembered animal parts? And had no presumptive identification?

### **P74 Shockingly Deadly: Streptococcal Toxic Shock Syndrome**

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A 98-year-old woman with a medical history significant for severe dementia, hypertension, hyperlipidemia, hypothyroidism, and stasis dermatitis secondary to peripheral vascular disease was found in an altered mental state at a nursing home. Earlier that morning, she was found in her normal state of health. The staff notes that she now has increasing shortness of breath, a fever of 101.4 F, and difficulty maintaining oxygen saturations above 90%. A chest X-ray was performed and revealed perihilar and interstitial infiltrates with probably bilateral pleural effusions.

Upon arrival of emergency medical services, she became unresponsive, tachycardic, hypotensive, and hypoglycemic (blood sugar 60 mg/dL). Assessment by the emergency department revealed a Glasgow coma score of 3, pancytopenia, acute kidney injury (blood urea nitrogen 33 mg/dL and creatinine of 2.18 mg/dL), a coagulopathy (prothrombin time 26.2 seconds, partial thromboplastin time 2.3 seconds, INR 2.3), lactic acidosis (7.1 mmol/L), hypoalbuminemia (1.4 g/dL), and elevated BNP (32, 463 pg/mL). Her blood pressure rapidly declined to 59/20 mmHg and she was placed on Levophed. Blood cultures were drawn, she was administered antibiotics, and then expired within 3 hours of presentation.

At the time of autopsy, it was noted that her left upper extremity was 2.5 times the size of the right upper extremity in diameter and exhibited subcutaneous edema, erythema, and desquamation with bullae formation. Additionally, her bilateral lower extremities had numerous bullae, many ruptured, with yellow serous fluid in varying stages of healing. Pertinent autopsy findings included severe atherosclerosis of the distal aorta causing her severe stasis dermatitis, mild cardiomegaly (480 grams), pulmonary edema (combined lung weight 1050 grams), pleural effusions (right 200 mL, left 100 mL), congestive hepatopathy, and nephrosclerosis. Secondary to her acute respiratory failure, lung tissue was submitted for culture and was negative for growth. The microbiology lab was notified to continue growth of perimortem blood cultures. Within 24 hours, the blood cultures were positive for Group A  $\beta$ -hemolytic streptococcus (*Streptococcus pyogenes*).

Along with the positive blood culture for Group A streptococcus, the decedent exhibited hypotension defined by a systolic blood pressure less than or equal to 90 mmHg, renal impairment with a creatinine greater than 2 mg/dL, and hypoalbuminemia with pleural effusions. The cause of death for the 98-year-old woman was listed as streptococcal toxic shock syndrome. Shockingly deadly indeed.

### **P75 A Case of Fatal Infantile Head Injury with Complex Biparietal Skull Fractures: Can an Accidental Short Fall from Parental Standing Height be the Explanation?**

*A.E. Walker<sup>1</sup>*

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A four-month-old female infant died in hospital four days after her admission in a comatose state with an alleged history of an accidental fall onto a carpeted floor from her father's shoulder height. Computed tomography scans identified large extracranial soft tissue swelling of the right parieto-occipital region with subjacent widened right frontal and squamous sutures and extra-axial hematoma. Ophthalmological examination identified intra-retinal and pre-retinal hemorrhages in the left fundus. Hypoxic-ischemic encephalopathy without neurological recovery ensued.

Examination of the scene revealed that the impact surface consisted of a carpeted concrete floor (0.9 cm and 0.8 cm respective carpet and underlayer thickness).

Postmortem skeletal survey revealed extensive soft tissue swelling of the scalp and widened, bilateral fractures of the parietal bones (partly diastatic on the right and branched posteriorly on the left) that was Y-shaped fracture of the left and linear on the right. The radiological opinion was that these were complex, bilateral skull fractures, which indicated high energy impact in excess of what is usually generated in accidental falls in a domestic environment.

Postmortem examination did not reveal any evidence of impact injury of the occipital region of the head. Complex biparietal skull fractures with bruising and swelling of the overlying subscalp tissues were confirmed, with granular extradural hematoma and localised right subdural hemorrhage.

Specialist examination of the brain and spinal cord identified ischemic encephalopathy, subdural hemorrhage and a pattern of axonal injury more typical of trauma but should be interpreted with caution due to the extensive ischemic injury. The neuropathology was consistent with severe, fatal traumatic blunt force head injury of either accidental or non-accidental infliction but the findings in isolation did not allow for confident discrimination of the mechanism when viewed in isolation.

The eye pathology findings identified retinal hemorrhages in the left eye, the nature and extent of which was more extensive than would be anticipated from a simple short fall onto a carpeted floor. In isolation, the retinal hemorrhages could not exclude an accidental mechanism.

The combined radiological, general postmortem, neuropathology, and ophthalmology findings indicated that the father's account was not credible. The degree of blunt force needed to cause the spectrum of head injury was inconsistent with having been generated in a simple, single short-distance fall onto a carpeted floor from shoulder height. The injuries were more consistent with non-accidental infliction head injury by two separate forceful impacts. The father pled guilty to a criminal offence.

#### **P76 Retractions and Publication Ethics in Forensic Pathology**

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Introduction: Thousands of academic articles have been retracted from publication. The purpose of this study is to compare retraction rates of articles pertaining to forensic pathology to those in pathology, the impact factor of the journals implicated and to determine the reasons for the retractions and when the retractions were made.

Methods: Using the search terms "forensic pathology" and "pathology", the database of Retraction Watch (RW) an online database of retracted articles was interrogated for journal article retractions. With the addition of the term "retraction" to end of each initial search item, the database of the National Library of Medicine (PUBMED) was interrogated for retracted articles. The retracted articles in forensic pathology were subsequently sorted by journal name, number of authors, year of publication, journal impact factor (IF), time to retraction (TTR) and reason for retraction (RFR). Results: 459 of 25 000 pathology articles were listed as retracted on RW. Of the 459 retracted articles, five (1%) were on forensic pathology. They had been published between 2007 and 2013. Specific inquiry by article title on RW revealed the articles retracted and the RFRs. They are described as follows:

article 1 - 3 authors; 2012 - IF of 1.41- TTR of 59 months – RFR is duplication and miscommunication by author/third party

article 2 - 4 authors; 2013 – IF of 1.302 - TTR of one month - RFR is plagiarism ;

article 3 - 5 authors; 2013 - IF of 1.302 TTR of 28 months- RFR is plagiarism;

article 4 - 4 authors; 2007 – IF of 1.792 – TTR 20 months – RFR is lack of permission to use data ;

article 5 - 1 author; 2009 – TTR of 11 months –IF and RFR are unknown

There were no retractions associated with the American Journal of Forensic Medicine and Pathology (AJFMP), (IF of 0.785) the official journal of the National Association of Medical Examiners.

Discussion: Plagiarism accounts for 60% of retractions in forensic pathology. Retractions were discovered in other leading forensic pathology journals, except the AJFMP, which may be due to any of the following factors - article selection, rigorous peer review and the use of verification software. The miniscule retraction rate in forensic pathology compared to the rest of pathology may be due to fear of reputational damage that an forensic pathologist may suffer if a retraction is brought to a court's attention.

#### **P77 Simplified DNA Barcoding Strategy for Forensically Relevant Blow, Flesh, and Scuttle Flies**

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Accurate insect identification is critical to their use in estimation of time of colonization (TOC) and post-mortem interval (PMI) during medicolegal death investigations. Insect specimens are currently identified by evaluating morphological characteristics as indications of particular taxonomic groups; however, this process is limited because immature life stages typically lack distinguishing morphologies. Identification may be achieved by rearing live specimens; however, this process is time-consuming, labor-intensive, and not always successful.

These deficiencies may be addressed through molecular identification by DNA "barcoding" wherein DNA sequences from unknown samples are matched to references. This technology enables identification of immature specimens, may be performed without specialized forensic entomology training, and requires equipment common to forensic genetics laboratories. DNA barcoding has been demonstrated in numerous entomological surveys of forensically relevant species; however, the technology has not been implemented for medicolegal death investigations. This is due in part because of deficiencies in the technology: no single primer set is capable of distinguishing all of the diverse species important to forensic investigations. Instead, multiple primer sets and sequencing reactions are utilized to maximize the species that may be identified.

We demonstrate a simplified DNA barcoding strategy for identifying insects commonly encountered in casework at Harris County Institute of Forensic Sciences (HCIFS). The strategy comprises sequencing and phylogenetic analysis of a fragment amplified from the mitochondrial COI locus from which taxonomic identification may be statistically supported. Targeted species include those that have been previously encountered in our agency's medicolegal death investigations, in particular, members of blow-fly genera *Lucilia*, *Calliphora*, *Chrysomya*, *Phormia*, and *Cochliomyia*, the flesh-fly genus *Blaesoxipha*, and the scuttle fly genus *Megaselia*. The strategy is advantageous over previous methods in that all target species may be amplified using a single primer set. Identification is demonstrated for specimens whose species-level identification was known (i.e., colony-bred specimens or wild flies that have been identified by morphology). This is additionally demonstrated for larva and pupa collected during past HCIFS medicolegal death investigations for which species-level identification was undetermined by morphology. We describe a database of COI sequences

produced from local specimens which provide additional statistical analyses: phylogenetic analysis for direct sequence comparisons, and interspecific and intraspecific sequence variations for comparisons to local populations. Ongoing work includes the formal validation in support of casework application.

#### **P78 A Semi-Permanent Solution: The Body Encased in Concrete**

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We present the case of a body that was discovered encased in concrete in a blue plastic barrel. Due to the difficulty in examining the remains due to concrete, members of the Missouri Task Force One, a special team with experience removing persons from collapsed structures with as little injury as possible, were utilized to remove the body from the barrel. The barrel was cut using a saw, after which the fragments of crumbling concrete were radiographed and examined using a metal detector. The body was noted to be moderately-to-severely decomposed and largely skeletonized. A forensic anthropologist was consulted for further evaluation of the remains. The forensic anthropologist cleaned the remains, assembled them in anatomical position, and washed and screened the putrefying tissues to recover fingernails, bones, cartilage, and insects. The anthropologist determined that the remains had been placed in the barrel following some degree of decomposition based on the presence of concrete found inside the pants and undergarments surrounding the bone. Also supporting this conclusion was entomological evidence of fly puparia that had progressed through three larval instars before pupating. The biological profile indicated the remains belonged to a white male with a mean age estimate of 45.6 years with an associated standard deviation of 10.4 years.

Perimortem trauma was present in the form of blunt force trauma. The most significant blunt force traumatic impact was centered on the occipital bone, creating a fracture with accompanying radiating fractures, completely detaching the foramen magnum from the rest of the occipital bone. More fractures were present on the left maxilla, maxillary dentures, cervical vertebrae, and ribs. The anthropologist determined that a minimum of three traumatic impacts were necessary to account for all of the blunt force trauma to the skeleton. Additionally, sharp force cutting trauma had removed the head of the radius and a section of the ulnar bone. Careful examination of the powered saw used to extract the body from the concrete accounted for these postmortem findings.

The body was identified in part by a partial set of dentures with the decedent's name inscribed on them. Brain tissue was submitted for toxicology and was positive for amphetamine and THC. The decedent was identified as a 53-year-old male that had last been seen alive one year prior. The manner of death was classified as a homicide and the cause of death was consistent with blunt force injuries of the head.

#### **P79 WITHDRAWN**

#### **P80 Is Excited Delirium Underreported in Sub-Saharan Africa? A Look at Two Countries with High Rates of Police Violence**

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Objective: To determine why there are so few published reports of excited delirium (ExD) resulting from police-civilian interaction in Sub-Saharan Africa (SSA).

Methods: Study is focused on police action deaths occurring in Nigeria and Kenya. The study had four arms as follows:

1. Search of PubMed database for published papers on ExD in all languages, using the search term "excited delirium" to determine how many originated from SSA.
2. Search of PubMed database for published papers on delirium in SSA in all languages, using the search term "delirium Africa" to determine how many originated from SSA.
3. Search of government websites for data on deaths due to police action from official sources.
4. Search for data on deaths due to police action from unofficial sources (websites operated by such non-government actors such as investigative journalists and human rights groups -Missing Voices in Kenya and the International Society for Civil Liberties and The Rule of Law in Nigeria, Human Rights Watch and Amnesty International).

Results: There were 180 relevant studies on "excited delirium" and 61 on "delirium in sub-Saharan Africa". Of an estimated 71 581 in-custody deaths since 2004, there were no reports on ExD relating to arrests by law enforcement from either official or unofficial sources. In contrast, delirium is a fairly common hospital admission diagnosis attributed mostly to infectious diseases (eg malaria, HIV) and underlying untreated medical comorbidities (hypertension, liver failure, alcohol use).

Discussion: There is not a single published case of ExD from SSA either from academic databases or from nongovernment agencies. The high burden of infectious diseases such as malaria and HIV, and medical comorbidities such as hypertensive strokes account for most causes of delirium. Decedents almost universally present at a healthcare facility including cases brought in by police. In contrast, law enforcement in Western countries is more likely to be called to resolve mental health crises including situations where the victim is delirious or appears to be delirious. Deaths during physical restraint are also more likely in the West. No deaths were associated with Taser use.

Conclusion: For undetermined reasons, there are no published cases of excited delirium occurring during law enforcement restraint of civilians in sub-Saharan Africa. This could be due to such individuals being taken to hospital directly by relatives before contact with police, a lack of accurate data gathering, or law enforcements ready access to and use of firearms.

#### **P81 WITHDRAWN**

#### **P82 To Publish or to Perish: Predatory Journals and the Budding Academic Forensic Pathologist**

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Introduction: The term predatory journal was coined in 2008 by Jeffery Beal, a University of Colorado librarian who applied it to journals that exploited or "preyed" on young or inexperienced authors by charging fees without subjecting the work to proper peer review. The young researcher, keen to establish a track record of scholarly activity to secure academic promotion, might be tempted to submit their work to a journal that promises quick peer review and open access publication – often for a stiff submission fee. These so-called predatory journals have some or all of the following characteristics: they typically send unsolicited psychophantic email invitations from an individual who may not be the editor-in-chief; have no

idea of what you claim as expertise; are not indexed in well established databases (such as PubMed, Medline, Web of Science, Scopus); are unfamiliar to you and your colleagues; offer unusually fast peer reviews; publish poorly written articles; have no editorial offices listed or if they do, are listed incorrectly; present an amateur looking website; have similar names to respected journals or any of the words "International", "American" or "European" in their title. Of approximately 30 000 journals worldwide, up to one-third are believed to be predatory. Publishing in such journals may come at a professional cost since they are not held in high esteem by academic promotion committees and can cause reputational damage.

Recommendations: Some important factors to consider when selecting a reputable journal in which to publish your research; 1. Journal age (older usually means better established); 2. Frequency and consistency of publication (not ideal if inconsistent and infrequent); 3. Affiliation to a professional body (confers more prestige); 4. Geographic composition and diversity of the editorial board (having well regarded experts from around the world is generally better); 5. Method of peer review (should ideally be double-blind); 6. Time from submission to decision (too short an interval may mean no or inadequate peer review); and 7. Is the journal the type that will generate interest in your article and increase citations of your work?

Conclusion: Despite the criticisms of traditional publishing model such as lengthy peer reviews, expensive subscription plans and high costs of open access, they are generally well known and established. Forensic pathologists must be careful when selecting journals in which to publish their research. Consult with colleagues who publish regularly and do your own research.

### **P83 A Partnership to Consider: How Pathologists' Assistant Training Can be Utilized to Decrease the Forensic Pathologist Workload**

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Despite the laudatory numbers of the 2021 NRMP, the overall number of medical graduates choosing Pathology as a specialty, was not sufficient to fill the 611 available spots in the 164 nationally accredited pathology programs. This is not unheard of. In fact, the 2020 Physician Specialty Data executive summary, published by AAMC, reported that between 2014 to 2019, certain specialties like sports medicine grew by 55.3%, while anatomic/clinic pathology decreased in number by -7.03%.

With Pathology residency spots remaining unfilled for the last seven years, the numbers of those who, after completing a pathology residency pursue a forensic fellowship are even lower and, as a result, there are less than 500 board-certified forensic pathologists (BCFP) practicing full-time in the United States.

The low numbers of practicing board-certified physicians combined with a recent increase in the number of deaths requiring forensic investigation from the national opioid crisis, higher crime rates, and now the COVID-19 pandemic, have increased physician workloads, physician burnout, and has placed the medical and public health community in a precarious situation. Now, more so than ever, it is critical to staff medical examiner and coroner (ME/C) offices with qualified, forensic-trained, practitioners that can provide ancillary services that support and strengthen ME/C offices and ease the workload of practicing BCFPs.

Certified, university-trained pathologists' assistants (PAs) can fill this role. A Pathologists' Assistant holds either a bachelor of science or master of science degree in pathologists' assistant studies, and a certification from the American Society for Clinical Pathology (ASCP). The scope of practice of a PA is endorsed by the College of American Pathologists (CAP) and has

expanded in recent years to include the management and supervisory aspects of surgical pathology, the triaging and processing of tissue for special studies, photography, education of residents and medical students, and in the support of tissue-based research in biobanking. In the course of their pathology intensive academic and clinical training, PAs are also trained in forensic, medicolegal, and hospital autopsies and Forensic Pathology, making them qualified to perform under supervision, or assist in, clinical and/or forensic autopsies, collect tissue for microscopy and toxicology, and perform many other ancillary duties that can facilitate the daily job of a BCFP.

### **P84 Beta-Blockers in Overdose: Metoprolol Concentrations in Postmortem Investigations, 2020-Q1 2021**

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Beta-adrenergic blockers, also known as beta-blockers, are a class of drugs used to treat several cardiovascular conditions, including angina, hypertension, and chronic heart failure, by preventing sympathetic stimulation of the heart. In addition, beta-blockers can be used to treat migraines, glaucoma, and anxiety. Beta-blockers bind to beta 1 ( $\beta_1$ ) and beta 2 ( $\beta_2$ ) receptors, thereby blocking epinephrine and norepinephrine from binding.  $\beta_1$  receptors are found predominantly in cardiac, renal, and adipose tissue, whereas  $\beta_2$  receptors are concentrated in smooth muscle and blood vessels.

One of the most prescribed beta-blockers is metoprolol. Metoprolol is a selective inhibitor of  $\beta_1$  receptors that delays cardiac conduction and decreases heart rate, contractility, and ejection fraction. Adverse reactions associated with metoprolol include dizziness, fatigue, bradycardia, hypotension, seizure, cardiac failure, and coma. Although considered to have relatively low toxicity at therapeutic doses for its indicated conditions, there are reported cases of death caused by massive acute metoprolol ingestions.

From January 2020 to February 2021, NMS Labs quantified metoprolol in 250 postmortem cases using liquid chromatography-tandem mass spectrometry. Blood concentrations ranged from 12 to 170000 ng/mL with a mean and median of 5818 and 340 ng/mL, respectively. Demographic data were not available for every case. The age and sex of the deceased were reported in 144 and 176 of the cases, respectively. The mean and median age was 57.5 years old (range, 7-93 years), and the decedents were 40.9% female and 59.1% male.

Although metoprolol is safe at therapeutic concentrations (range, 35-500 ng/mL in whole blood), fatalities have been reported at an average concentration of 60000 ng/mL (range, 4700-142000 ng/mL). Of the 250 postmortem cases identified in this study, 58.0% had blood concentrations within or below the therapeutic range, whereas 15.2% were within or above the fatal range. Several cases were submitted as suspected metoprolol overdoses, including a case of an individual with a prior history of suicide attempt by metoprolol and ethanol ingestion. Overall, metoprolol overdoses are uncommon. However, death investigators should be aware of the potentially fatal outcomes of metoprolol overdose and the need for specialized testing in cases of suspected beta-blocker toxicity.

### **P85 WITHDRAWN**

### **P86 Increasing Prevalence of Gabapentin in Fatal Drug Overdoses**

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<sup>1</sup>*Cuyahoga County Medical Examiner's Office, Cleveland, Ohio, USA*

**Introduction:** This study was conducted to characterize gabapentin related overdoses from 2016 to 2020. Gabapentin is a gamma-aminobutyric acid (GABA) analog indicated for postherpetic neuralgia, diabetic neuropathy and adjunctive partial seizure therapy. Gabapentin has also been used as an alternative to opioid pain relievers in the treatment of chronic pain.

**Methods:** Cuyahoga County Medical Examiner's Office (CCMEO) files involving fatal gabapentin overdoses between 2016 and 2020 were studied. Decedent prescription drug monitoring program (PDMP) files were reviewed to determine prescription history. Drug seizure data were also examined to ascertain gabapentin diversion trends.

**Results:** 206 gabapentin-related fatalities were identified. The number of fatalities rose over the study period from eight in 2016 to 85 and 84, respectively, in 2019 and 2020. 126 (61.2%) of decedents were male. 171 (83%) decedents were white. The mean age of decedents was 49, where 53% of decedents were aged 45 to 64 years. Fentanyl was present in the majority of deaths (79%) with higher percentages in later years. Ninety percent of decedents (178) had a PDMP file. Of these, 73.2% had a gabapentin prescription, 68.2% had an opioid prescription (excluding Medication Assisted Treatment drugs) and 57.1% of decedents had both an opioid and gabapentin prescription. Gabapentin prescribing was relatively steady from 2018 to 2020 with 30 000 prescriptions per month, slightly down from 2017 with an average of 35 000 prescriptions per month. Gabapentin was most prescribed to the 55-64-year-old age group. Gabapentin is not a controlled substance in our jurisdiction so accurate figures prior to 2017 are not available. Drug seizures rose exponentially in the study period from 118.5 mg (2016) to 1316.9 mg (2020).

**Conclusions:** Gabapentin fatalities increased substantially over the last five years, often in association with fentanyl. Incomplete prescribing data remained relatively stable but drug seizure prevalence suggests a significant rise in diversion. Continued off-label usage requires caution.

### **P87 Rapid DNA Identification of Human Remains: An Overview of Research and a Path to Implementation**

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<sup>1</sup>*ANDE Corporation, Longmont, Colorado, USA*

DNA identification of human remains, either of single individuals or multiple individuals in mass fatality incidents, is a powerful and definitive tool to link the deceased to their family members. In the past, DNA testing has been performed by a forensic laboratory where long backlogs can extend turnaround times, delaying closure for the families involved. Rapid DNA testing is a tool that allows coroner and medical examiner offices to perform DNA identifications quickly, providing answers and closure to families in a fraction of the time it has taken in the past.

While every case is different, Rapid DNA can be used effectively for remains recovered in a wide range of circumstances and postmortem intervals. In some cases, the decedent may have been recovered soon after death and testing can be performed quite easily either to identify the individual by comparing to personal artifacts or presumed known DNA samples. In other cases, the remains may be fragmented, exposed to fire, or exposed to the elements for varying lengths of time, adding more reliance on DNA testing results.

This presentation will discuss research and validation testing performed to demonstrate the efficacy of the ANDE Rapid DNA System with a wide variety of human remains. DNA testing results generated from recently

deceased human donors as well as human donors who were exposed to the elements for up to 12 months will be described. Postmortem buccal, liver and muscle samples have been shown to yield successful results in the first few days to a week following exposure. Bones and teeth yielded results at 1 year and could easily be expected to provide useful DNA typing information over much longer timeframes.

Finally, a discussion of the types of cases that can be quickly tested using Rapid DNA, the training required for its use and the path to implementation of Rapid DNA will round out the presentation.

### **P88 The Impact of Skin Color on the Identification of Blunt Force Injuries**

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Medical education primarily focuses on the representation of injuries or other bodily marks in light skinned individuals as a direct method of training and study. The emphasis within this type of training can create issues within the identification and/or diagnosis of a similar injury or mark that occurs in minority groups with darker skin tones. This project seeks to explore issues of bias and prejudice among different racial and ethnic groups within the context of forensic pathology and medicolegal death investigations. Through a records review, in collaboration with the Washington DC and Maryland Office of the Chief Medical Examiner, blunt force injuries from 30 Black and 30 White motor vehicle accident victims from 2020 will be quantified based on statements from the autopsy report and the autopsy diagram. Injuries are cross-compared between the race of the individual and the race of the medical examiner. It is hypothesized that fewer abrasions and contusions will be identified in dark-skinned individuals. Furthermore, we explored if there is a racial observer bias, by determining if the race of the medical examiners aligns with the race of the victims. At the end of the project, we will anticipate a lower detection rate in dark-skinned victims, which may result in an underreporting of injuries in dark-skinned individuals and consequential discrimination against individuals in our society.

### **P89 The Art of the Review: How to Avoid being the Dreaded "Reviewer #2"**

*K. Obenson<sup>1</sup>*

<sup>1</sup>*Dalhousie University/Horizon Health Network Saint John, Saint John, Canada*

**Background:** Since the late 19th century, peer reviews (PRs) have been used regularly to select articles for publication. However less than 50% of a recent study of 1340 top scientists around the world thought the process was fair—up to 60% thought that reviewers were frequently incompetent! While most forensic pathologists, appreciate the value of PR in scientific publication and understand its place in ensuring quality, few receive any training (formal or informal) in PR. Peer review of course can be a thankless task without any outwardly visible reward to the reviewer. As busy professionals, service work sometimes precludes us from participating in reviews. But if few people are willing to perform reviews, how then can we advance intellectual rigor in forensic pathology?

**Discussion:** In broad terms, the knowledgeable peer reviewer will screen articles for methodological flaws, examine how the results are reported (almost 2% of researchers in one study admitting to fabricating or falsifying data at least once in their careers) and decide whether the conclusions are valid. A good reviewer would have identified their area of expertise to the journal; be known to provide timely and constructive feedback to the

authors that does not only improve the submission, but could also offer helpful pointers for future research; should acknowledge a bias and decline a review if they believe they cannot provide an objective review; promptly decline a review if they cannot commit to the deadlines or lack the expertise; is consistent in the comments made to the authors and editors, is clear about what they would like the authors to change to improve the manuscript and; maintains a respectful tone by not denigrating the quality of the writing even if it is indeed of substandard quality. Focusing on important concepts (rather than on minor spelling errors that will be corrected anyway on copy editing) is important. Avoid condescending comments about the authors' English language skills, and do not insist they cite your work unnecessarily. A good reviewer will maintain confidentiality and not seek to benefit unethically by using information from studies without the authors' consent.

Conclusion: Forensic pathologists should be trained in article PR and where possible be given time to do so. The reviewer benefits by improving the quality of their own writing, gaining new knowledge of the latest advances, and by participating in the gatekeeping role essential to the advancement of good science.

#### **P90 Loss of Nuclear Basophilic Staining as a Postmortem Interval Marker**

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We evaluated postmortem loss of basophilia (LOB) as an objective marker of postmortem interval (PMI). Such a correlation has been previously reported in stillborn fetuses. The degree of loss of nuclear basophilia in different tissues was scored using hematoxylin and eosin (H&E)-stained slides obtained from 65 random human autopsy cases. We also extracted other information related to decomposition. Scatter plots were used to visually assess the correlation of PMI with our LOB scores. We found that LOB did correlate with PMI (total and unrefrigerated intervals). Complete LOB correlated best with PMI. LOB also correlated with a body decomposition score. We further explored the basis for the LOB. We hypothesized that if autolysis was a major factor in the LOB, then it would vary with the tissue type and that if putrefaction was a major factor, then we would expect to see bacteria and fungi associated with the LOB. We found that LOB did vary with tissue type, but poorly with the observable presence of bacteria and fungi, suggesting that autolysis was the primary mechanism of LOB. Refrigeration appeared to stop the autolytic process that causes the LOB. The heart, liver, and lung tissues were more reliable than brain and kidney tissues for this purpose. We generally found that complete LOB is to be expected by 72 hours, with the exception of brain, where the LOB may be partial.

#### **P91 Fatal Iatrogenic Cardiac Tamponade: An Unreported Complication of Laparoscopic Cholecystectomy**

A.E. Walker<sup>1</sup>, V. Nair<sup>1</sup>  
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Cholecystectomy is the most common elective abdominal surgery, the vast majority of which are performed laparoscopically. Laparoscopic cholecystectomy (LC) is a very safe procedure with only 2% of complications which range from surgical site infection to serious morbidity and death. The experience of the surgeon plays a major role in the incidence of complications.

In a review of 233 published studies on LC, 967 complications were reported of which 204 (21%) were defined. Conversion to open

cholecystectomy was most common in 135 (58%) studies, followed by bile leak in 89 (38%) and bile duct injury in 75 (32%). Mortality was reported in 89 studies (38%).

The case of a 76-year-old woman who developed cardiac tamponade from 300 mL of clotted hemopericardium secondary to traumatic perforation of the posterolateral wall of the left ventricle within 24 hrs of an elective LC for cholelithiasis is presented. There was fair bit of hemorrhage within the soft tissues overlying the inferior region of the pericardium ventrally, near its junction of the ventral and diaphragmatic pericardium which made identification and avoidance of any puncture sites in that region of the pericardium a challenge.

Formal cardiac pathology consultation of the heart and pericardial sac revealed two epicardial defects (2.0 cm and 1.3 cm) of the posterolateral and posterior walls of the left ventricle with significant tracked epicardial hemorrhage. The defects extended into the underlying myocardium, with full-thickness perforation of the wall into the ventricular cavity by one of the defects, without features of associated acute myocardial infarction.

The pattern of injury in this case is explained by iatrogenic perforation during LC. To our knowledge, this is a first reported case of fatal iatrogenic perforation of the left ventricular wall as a complication of LC and this case adds to the spectrum of published complications.

#### **P92 Fatal Iatrogenic Cervical Spinal Cord Injury in an Adult Man: A Case Report**

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<sup>1</sup>University of Ottawa, Ottawa, Canada

Spinal cord injuries (SCIs) can occur from hyperextension injury of the cervical spine in older individuals with underlying spinal stenosis from cervical spondylosis and the biomechanical mechanisms have been demonstrated from as far back as 1951.

A 68-year-old man with a history of DM, OSA, HTN and clipped cerebral aneurysm died in hospital after he had exhibited tetraplegia following general anaesthesia for insertion of a double J ureteral stent. CT scans revealed cervical stenoses at two levels (C3/4 and C4/5) with herniation of the C5/6 intervertebral disc. There was no acute bony injury. MRI was contraindicated due to the in situ metallic clip of his cerebral aneurysm. CT myelogram confirmed impingement of the cervical segment of the spinal cord so anterior decompression with fusion of the cervical spine was performed, but his neurological status remained unchanged and death ensued.

Postmortem examination revealed the body of an obese, older man with features of recent cervical spinal surgery. There was no infection of the surgical site. Histopathology of the neurosurgically excised cervical tissue revealed fragments of degenerated intervertebral disc; no neoplastic tissue was evident.

Examination of the decalcified cervical spine revealed a bone graft held in place by a metallic plate and screws. Histological examination of whole mount sections revealed posterior displacement of the intervertebral disc with anteroposterior compression of the spinal cord with associated necrosis and fragmentation to account for the lack of neurological recovery post-operatively.

The left ureter contained an in situ double J stent and a stone. Standard histological examination of the other tissues did not identify any other pathology that contributed to death.

Clinicopathological considerations indicate that this man had died as a consequence of necrotic compression of the cervical segment of his spinal cord secondary to posterior prolapse of an intervertebral disc into the cervical spinal canal on a background of chronic changes. Clinicopathological considerations made it reasonable to postulate that hyperextension of the neck during intubation had precipitated compression of the cervical spinal cord in this older man in the context of underlying narrowing of his cervical spinal canal, which is a reported, well-recognized complication in the medical literature.

### **P93 Conducted Electrical Weapon Temporally-Related Deaths: Case Reviews of Medicolegal Death Investigations and Autopsies with Manner of Death Considerations**

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Conducted electrical weapons (CEW) have been used by law enforcement (LE) to help control individuals that may be at risk for harming themselves or others. When death is temporally related to the discharge of a CEW, a thorough medicolegal death investigation and full autopsy with toxicology studies are necessary for a forensic pathologist to best opine a cause and manner of death. Three deaths that followed CEW discharge by LE are reviewed. The first death involved a stab wound of the chest due to the decedent falling forward onto a knife he held in his hands. The second death was due to complications of blunt force head injuries due to the decedent falling backwards onto the concrete sidewalk. The third death was caused by multiple gunshot wounds after the decedent killed another person and advanced toward LE with a knife. An understanding of the totality of the circumstances, which requires review of all available investigative information, to include review of available video, and a full autopsy with toxicology studies are critical for a forensic pathologist to consider when deaths are temporally related to CEW discharge. Manner of death considerations are discussed in the context of temporally-related CEW discharge deaths.

### **P94 A Simple Sodium Nitrite Test for Death Investigators**

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The cataloging of any medications, illicit drugs and/or suspicious items is one essential investigative task that must be completed at death scenes. One particular challenge is the processing of bottles or drinking cups containing residual liquids. Failure to secure such evidence for future analysis can jeopardize suspected poisoning cases where initial toxicology test results are negative or inconclusive. At the time of this abstract submission, sodium nitrite (SN) is a well-discussed method of suicide in internet forums. One forum even gives SN its own wiki page with a detailed "how-to" guide. Oxidizing substances such as SN oxidize the ferrous (Fe<sup>2+</sup>) state of the hemoglobin to the ferric (Fe<sup>3+</sup>) state and convert hemoglobin to methemoglobin, which causes loss of ability to bind and transport oxygen. Methemoglobin levels of  $\geq 50\%$  can lead to tissue hypoxia and death. Suicide forum members discuss the importance of verifying the purity of the purchased SN product; it is deemed risky to use SN without testing it beforehand. Aquarium test strips are one suggested way to accomplish this step. These have an indicator pad for nitrite, are inexpensive, simple to use and read, and are nondestructive to the liquid. Results can be photographed for documentation purposes. To demonstrate the utility of this qualitative approach to check liquids for SN presence at death scenes, test strips and analytical-grade sodium nitrite were purchased commercially online. The forum's "how-to" guide instructions were followed to create a water-based mixture containing two teaspoons of

SN. A negative water control and mixtures containing different SN concentrations were also prepared and tested over a five-day period. This method was also checked for its utility if only residual liquid remained in a container. To recreate this circumstance, two teaspoons of SN were added to a 500 mL bottle of water, mixed well, allowed to sit for five min and then emptied. A small amount of fresh tap water, first checked to ensure it was nitrite negative, was then added to the bottle and checked with a test strip. The test strip results were photographed. The presented method and best practice tips outlined in this study can be used by death investigators at the scene to rapidly screen samples for nitrite, enabling medical examiners to direct confirmatory toxicology testing.

### **P95 Beta-Hydroxybutyric Acid and Hemoglobin A1C as Postmortem Diagnostic Markers of Diabetic Ketoacidosis**

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Ketoacidosis is a metabolic state that develops because of excessive ketone body production by the liver during conditions including starvation, a carbohydrate-restrictive diet, alcoholism, and/or uncontrolled type 1 diabetes. Type 1 diabetes is a chronic condition in which the pancreas produces an insufficient quantity of insulin, which can result in the development of diabetic ketoacidosis (DKA). DKA is potentially life-threatening and is characterized by hyperglycemia, hyperketonemia, and metabolic acidosis. From a postmortem forensic toxicology perspective, diagnosis is most often completed by evaluating acetone concentrations in blood and glucose concentrations in vitreous fluid. Several complexities, however, exist with this method. First, acetone concentrations do not always correlate well to the severity of a DKA episode and positive findings can be from acetone or isopropanol ingestion. Second, vitreous glucose levels decrease rapidly in a time and temperature dependent manner after death in vivo and in storage. Because BHB is the predominant ketone body formed during ketoacidosis, BHB testing is warranted when acetone and glucose results (e.g., positive acetone with negative glucose; no detected acetone with elevated glucose) are insufficient for diagnosis. It is, therefore, important to test for BHB in those cases where DKA is suspected or requires exclusion. Another approach that may be helpful in select circumstances is hemoglobin A1C (HbA1C) testing. Since HbA1C accumulates in red blood cells during their 120-day lifespan, the amount of HbA1C in the blood is dependent on the mean glucose levels during the 8 to 12 weeks preceding measurement. HbA1C levels can identify long term poor blood sugar control, which increases the risk of diabetic complications such as coronary disease, heart attack, stroke, and kidney failure. To underscore and demonstrate the utility of BHB and/or HbA1C as postmortem diagnostic markers of DKA, cases will be presented where testing was a critical component of the death investigation process.

### **P96 WITHDRAWN**

### **P97 Sudden And Unexpected Death In Infancy: SARS-COV-2 as an Unexpected but Important Etiology**

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Introduction: We report on four cases of sudden unexpected death in infants (SUDI's) that were all found unresponsive after a routine period of sleep and were subsequently admitted to Tygerberg Forensic Pathology Services for further medicolegal investigation to determine the cause of death. No overt medical symptoms were reported in any of the cases prior to death,

however the infants tested SARS-COV-2 positive. Numerous global studies portray SARS-COV-2 primarily as a disease in adulthood, with a 1% morbidity rate in patients under the age of 10 years and a neglectable case fatality rate in children younger than nine years old, with figures particularly reflecting its rarity in infants. Symptoms of the disease often run a mild course in children; and infants in particular can be asymptomatic. According to the Centers for Disease Control and Prevention, the most common comorbidities in SARS-COV-2 positive cases in children were cardiovascular diseases. Tachycardia was found to be one of the common clinical signs upon admission to hospital, with approximately 20% of SARS-COV-2 positive cases in children reporting to have arrhythmias.

**Methods:** A full medicolegal death investigation was conducted on all four cases, including a comprehensive previous medical history, complete autopsy and ancillary investigations, which included molecular analysis of the *SCN5A* gene (most prevalent gene associated with arrhythmogenic disorders in SUDI's), in order to identify any possible pathogenic variations associated with an arrhythmic cardiac disease, which may have predisposed these SARS-COV-2 positive infants to sudden death.

**Results:** At autopsy, external examination of the bodies revealed no injuries. Radiological examination revealed evidence of a lower respiratory tract infection in only one case, which was deemed the cause of death, due to COVID-19 infection. In another case the lungs showed no histological features of infection, however internal examination of the kidneys revealed a pyelonephritic process. The remaining two cases showed no evidence of macroscopic nor microscopic pathology, with their cause of death still listed as undetermined. Upon submission of this abstract, the postmortem molecular results are still outstanding, however at the scheduled time of the conference the results will be reported on.

**Conclusion:** The reported fatality rate of SARS-COV-2 in infants is extremely low, with a paucity of data on the terminal cause of death in asymptomatic SARS-COV-2 positive infants that die suddenly and unexpectedly. This study aimed to investigate the possibility of a cardiac arrhythmogenic disorder as an underlying comorbidity in COVID-19-positive infant deaths.

## NOTES

**National Association of Medical Examiners  
2021 Annual Meeting – Author Index**

Aardema, Adrienne	1.5	Cohen, Marta	6.5
Adamczyk, Jessica	1.6	Cohle, Stephen	3.1
Adelizzi, Betsy	3.2	Collier, Scott	P54
Adidam Venkata, Chalapathi Rao	P30	Collins, Gary	P58
Alabbasi, Samah	P90	Cooney, Emma	P55
Alturkustani, Murad	P1, P2	Comelison, Jered	P28, P71
Andrade, Bethany	P55	Cortes, Irma	12.1
Andrew, Thomas	9.2	Cross, Chad	1.7
Andrews, Elizabeth	P37, P46	Crowson-Hindman, Lauren	P16
Aoun, Batoul	3.11, P14	Curry, Erica	P54
Arabadjief, Darius	P12	Dalson, Jaycie	P29
Arunkumar, Ponni	3.10, P69	Daoud, Elena	P15
Askenazi, Manor	4.2	Darrisaw, Lora	P37, P46
Atherton, Daniel	10.4	Dau, Georgia	4.8
Auld, Finn	3.3	Davis, Annie	1.4
Avedschmidt, Sarah	3.1, 6.2	Davis, Gregory	10.4
Bailey, Kristi	P71	Dean, Stephanie	P63
Baker, Andrew	3.7	deJong, Joyce	P27, P71, P93
Barnard, Jeffrey	2.4, P27	DeJoseph, Maura	1.3
Barrale, Peter	P39	Denmark, Adam	11.6
Beary, Mark	P78	Denton, Scott	4.10
Behonick, George	P35	Deol, Rory	7.3
Bell, Michael	7.2	DePew, Sarah	10.4
Berg, Eric	3.7	Desai, Sapna	4.5
Berran, Philip	4.8	Devinsky, Orrin	4.2, 9.2
Bethel, Mark	P53	Di Vella, Giancarlo	P59, P60
Bhullar, Manreet	4.6, P86	Diaz, Francisco	P90
Bihun, Tatiana	P20	DiMarco, Michelle	P37
Blumenthal, Ryan	6.6	Donley, Michael	P77
Bockoven, Crystal	P1, P2	Donnelly, Jacob	6.2
Bollinger, Katherine	8.2	Douglas, Elizabeth	3.12, P24, P27, P71
Bonaccurso, Luana	P59	Drake, Rosanna	P47, P48
Bonin, Brandon	4.11	Dye, Daniel	10.4
Boos, Terrence	8.2	Eisenstat, Jonathan	P37
Bosco, Caterina	P59	Ely, Erin	P20
Boyer, Philip	P44	Ely, Susan	11.1
Brink, David	P20	Eutenier, Bridget	12.1
Brown, Patrice	3.9	Evangelista, Frank	4.5
Brown, Theodore	1.6, 3.12, P71, P93	Fadel, Saleh	3.5, P18
Bruner, Evelyn	3.8	Falls, Randall	P44
Bui, Trung Thanh	P27	Falzon, Andrew	4.1
Burke, Allen	P45, P47, P48	Faustin, Arline	4.2
Butler, Daniel	3.8	Favretto, Donata	P59
Cain, Matthew	2.5	Fazel, Mariam	P5
Calleo, Vincent	P68	Felo, Joseph	P50
Campman, Steven	3.13	Fierro, Marcella	10.7
Cannon, Dawn	7.1	Finelli, Louis	P58
Caplan, Michael	3.11, 11.2	Fisher-Hubbard, Amanda	P71
Carr, Haley	P39	Flynn, Brianne	P4
Catanese, Charles	8.1, P39, P94	Forsyth, Jennifer	P13
Caterer, Candace	4.4	Fox, Pat	4.10
Cattaneo, Francesco	P59	French, Julie	P87
Cavanaugh, John	2.5	Frey, Merrilee	P35
Cena, Greta	P59	Friedman, Oren	P5
Cephas, Paige	P26	Furlong, Mary	P34
Chambers, Meagan	P33	Gabriele, Alessandro	P60
Chaudry, Irfan	6.2	Gallego, Daniel	P8
Chen, Christine	4.11	Gencarelli, Kaitlyn	P52
Cho, Patrick	P31	Gerisch, Johanna	P58
Christensen, Erik	P38	Ghandiii, Mehrnoosh	P9
Cirko, Alexis	P52	Gill, James	1.3, 11.1
Clark, Michelle	1.3	Gilson, Thomas	4.6, P86
Clark, Steven	11.4	Gitto, Lorenzo	4.9, P11, P66, P68, P69, P72
Cline-Parhamovich, Karen	12.4	Glogowski, Sarah	P7

**National Association of Medical Examiners  
2021 Annual Meeting – Author Index**

Goldfarb, Bruce	12.2	Lear, Kelly	9.2
Gongolli, Julita	P22	Lee, Junghyae	4.6
Goodale, Elicia	P51	Leitner, Dominique	4.2
Gorniak, Jan	4.4	Lenfest, Stephen	P15
Gould, Laura	4.2, 9.2	Li, Ling	P26, P52
Goussard, Pierre	P97	Lin, Peter	9.2
Grande, Abigail	P27, P71	Linert, Brian	P17
Guan, Jia Jun	P10	Lofaro, Ellen	5.1
Guardado Salazar, Cristo	4.1	Logan, Barry	1.1, 8.3, 8.4, P95
Guileyardo, Joseph	P7	LOHMANN, JUSTIN	P42, P43
Gunther, Wendy	P32	Lohmann, Michael	9.3
Guzman, Miguel	P20	Lokken, Alexander	P19
Guzzetta, Melissa	4.2, 9.2	Looman, Karen	11.6
Hagen, Catherine	3.9	Lopez, Ana	P41
Hall, Erin	P13	Lopez Diaz, Taryme	P12
Hammers, Jennifer	1.2	Loughney, Elizabeth	3.7
Harvilla, Nicole	P63	Lucas, Jonathan	3.13
Henry, Fernanda	12.7	Lupariello, Francesco	P60
Herb, Thomas	P6	Luthringer, Daniel	P5
Hersh, Amanda	P55, P74, P78	Mabotja, Suzan	6.6
Heurich, Chuck	9.4	Madison, Kathy	P53
Hlavaty, Leigh	P40	Madsen, Michael	P21
Hoffman, Glenn	1.4	Mahabir, Roshan	P1, P2
Holden, Brittany	P7	Mahapatra, Lily	3.4
Hord, Earl	1.4	Majeed, Marwan	P44
Human, Jani	P97	Maleszewski, Joseph	6.1
Huynh, Kevin	2.3	Maloney, Katherine	4.2, 9.2
Ikponmwonba, Christine	P64	Manini, Alex	8.3
Innocenzi, Fabio	P59	Marco, Stephanie	P84
Isenschmid, Daniel	P69	Mariann, Mason	P69
Jackson, Damian	P3	Marshall, Desiree	P8, P33
Jaeger, Daniel	4.9	Marshall, Pamela	1.2
James, Christine	6.3	Mathew, Ashley	P12
Janssen, Jennifer	1.4	Mattioda, Giuliana	P60
Jarrell, Heather	4.2, 9.2	McCleskey, Brandi	10.4
Jentzen, Jeffrey	11.5, P6, P14	McDonald, Anna	P9
John, Peter	1.4	McEntire, Betty	P64
Johnson, Bryan	9.3	McGuone, Declan	4.2, 9.2
Jones, Prentiss	1.6, P71	McGwin, Gerald	10.4
Jorden, Michelle	4.11	Mcleod, Elizabeth	3.7
Jufer Phipps, Rebecca	P63	McLeod-Henning, Danielle	9.5
Kahn, Roger	P77	McNaughton-Filion, Louise	P29
Kallan, Jamie	P38	Mecklenburg, Kori	P28
Kallen, Michael	P45	Melloni, Niccolò	P60
Kanshin, Evgeny	4.2	Melton, Annamaria	3.1
Karunanayake, Shalini	2.1, 2.5	Mendes-Kramer, VeraLucia	P83
Keller, James	4.10	Middleton, Frank	4.9
Kelly, Karen	P44	Mihaila, Dana	4.9
Kepron, Charis	10.8, P18	Miller, Catherine	P61, P70
Keyes, Kelly	8.2, 12.6	Miller, Ross	7.3
Kleeschulte, Megan	5.1	Ming Hon, Ann-Marie	2.2, P30
Klein, Dennis	P53	Mirri, Federica	P60
Konnick, Eric	P8	Moore, Caley	1.2
Kousar, Aisha	P44	Mooman, Paul	1.6
Koutana, Sarah Genevieve	P20	Morey, Mitchel	P53
Kreutz, Kasey	3.4	Morris, Catherine	2.2, 10., P30
Krotulski, Alex	1.1, 8.3, 8.4	Morrone, William	P31
Kruse, Kelly	P53	Morton, Ernest	P25
Kwiatkowski, Sam	P77	Mounajjed, Taofic	6.1
Labay, Laura	8.1, P94, P95	Muse, Evan	3.13
Ladenheim, Alexander	6.2	Nair, Vidhya	P18, P91
Landi, Kristen	9.2	Negrete, David	P5
Lantz, Patrick	P27	Nguyen, Teresa	P40
Lautz, Alison	P32	Nguyen, Van Anh	P26

## National Association of Medical Examiners 2021 Annual Meeting – Author Index

Nipple, Fahren	P52	Shanks, Kevin	P35
Nocco, Nicola	P59	Shattuck, Brandy	P71
Norton, Keith	P55, P74, P78	Shepherd, Timothy	4.2
Obead, Asmaa	P71	Slack, Donia	12.6
Obenson, Ken	10.2, 10.5, P76, P80, P82, P89	Smiley-McDonald, Hope	8.2, 12.6
Ogden, Emily	3.4	Smith, Colin	4.2
Olden, Nick	3.1	Snuderl, Matija	4.2
OLIVER, WILLIAM	P43	Solano, Jasmine	P52
O'Neill, Tiffany	P9	Sommer, Stephanie	12.5
Opsahl, Madeleine	P15	Sommers, Stephanie	3.1
Papsun, Donna	1.1, P84	Spencer, Emily	3.13
Parker, Elizabeth	P8	Sprigg, Alan	6.5
Pasquale-Styles, Melissa	4.7	Sta Cruz, Katrina	1.7
Paul, Amanda	2.5	Stacy, Christopher	P55, P74, P78
Perez, Catherine	3.6	Stahl-Herz, Jay	4.7
Peterson, Diane	6.3	Stoppacher, Robert	P72
Petiquan, Alex	P18	Strathmann, Frederick	P95
Pinckard, J. Keith	9.2	Su, Keng-Chih	6.2
Pinerri, Kathryn	9.2	Sung, Lokman	12.5, P40
Pink, Christine	P71	Szymanski, Linda	P1, P2
Pinneri, Kathryn	2.3	Tamburro, Lo	P28
Podduturi, Varsha	P41	Tart, Anna	P13
Prahlw, Joseph	1.5, 1.6, 3.12, P22, P23, P24, P25, P27, P71, P93	Tavares, Ozzie	1.7
Prahlw, Samuel	P23, P27	Tawil, Michel	P11, P68, P72
Prandecki, Ashley	1.7	Taylor, Andre	7.1
Presnell, Susan	3.8	Thach, Rasmey	P66
Pressley, DeMia	8.2	Thangamani, Saravanan	4.9
Pribil, Sarah	P26	Thompson, Matthew	P12
Quinton, Reade	3.9, 6.1	Titus, Jack	P63
Quiroz Moreyra, Flor de Maria	P26	Toffano, Edoardo	P59
Ramos, Christopher	3.12	Topol, Eric	3.13
Raven, Katherine	6.2	Topol, Sarah	3.13
Rayes, Omar	P40	Torkamani, Ali	3.13
Reichard, R. Ross	9.2	Tormos, Lee	7.2, P61
Reichard, Ross	4.2, 6.1	Tovar, Jason	6.2
Revercomb, Carolyn	P11, P68	Turbinville, Donald	1.3
Rex, Amy	12.1	Turner, Katherine	3.1
Reynolds, Erin	4.9	Ueberheide, Beatrix	4.2
Rice, Kathryn	P45	Uren, Grace	P97
Riemer, Ellen	P16, P51	van Deventer, Barbara	P97
Righi, Fabiola	3.9	van Niekerk, Chantal	P97
Rineer, Jenn	12.6	Verster, Janette	P97
Rodriguez, William	6.7	Villarino, Elsa	4.11
ROLLINS, MAXWELL	P42, P43	Viramontes, Ariel	P34, P90
Roman, Kristin	9.2	Vouyoukas, Eleftherios	P40
Ropero-Miller, Jeri	12.6	Wagner, Glenn	3.13
Rose, Claire	P17	Walker, Alfredo	2.2, 3.3, 3.5, 6.5, 7.4, 10.1, 10.8, 11.3, P18, P29, P30, P75, P91, P92
Rudman, Sarah	4.11	Walsh, John	4.8
Rueda, Manuel	3.13	Wang, Amber	P19
Rybkowski, Zane	P31	Wang, Zhuo	P35
Saayman, Gert	6.6	Warner, Margaret	9.6
Salfati, Elias	3.13	Warren, Wendy	3.7
Samuels, Albert	12.5	Waters, David	3.10
Sanders, Curpri	12.5	Weber, Skylar	P21
Sanford, Michelle	P77	Weedn, Victor	4.2, 12.2, P26, P52, P88, P90
Santiago, Christian	P88	Welch, Katie	P77
Schmidt, Carl	12.5	Wheeler, Erika	P48
Schoppe, Candace	P73	Wheeler, Ryan	5.1
Schubert, Pawel	P97	Whitby, Elspeth	6.5
Schwandt, Melissa	P87	White, Charles	2.4, P15
Serinelli, Serenella	P72	William, Christopher	4.2
Setia, Gayatri	P5	Williamson, Alex	9.2
Shah, Jamie	4.8	Wilscott-Davids, Candice	P97

**National Association of Medical Examiners  
2021 Annual Meeting – Author Index**

Wilson, Allecia	3.6, 3.11, P14
Wilson, Andrew	P53
Wilson, Brittany	P46
Wisniewski, Thomas	4.2
Wong, Liqun	8.2
Woolery, Samantha	P24
Yoder, Katelyn	P86
Yoder, Kathleen	4.10
Young, Kerry	P65
Zakariya, Eimad	3.10
Zhang, Alex	4.1
Zhou, Cecilia	2.4



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