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The complete program including abstracts is available on the
Western Michigan University Homer Stryker M.D. School of Medicine website:
http://med.wmich.edu/node/287

CME CREDIT

The CME Activity Code is available at the check-in table or on the TV screens on campus.

In support of improving patient care, Western Michigan University Homer Stryker M.D. School of Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team. Credit amount subject to change.

IPCE Credit

This activity was planned by and for the healthcare team, and learners will receive 5.0 Interprofessional Continuing Education (IPCE) credits for learning and change.

ACCME

Western Michigan University Homer Stryker M.D. School of Medicine designates this live activity for a maximum of 5.0 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

DISCLOSURES

Please see the handout offered at the registration table for a
listing of disclosure statements from today's presenters.

INTRODUCTION

RESEARCH, EDUCATION AND SCHOLARSHIP

The commitment and participation of Western Michigan University Homer Stryker M.D. School of Medicine (WMed), its faculty, and the Kalamazoo scientific community in "Research Day" continues on this day marking a 37th anniversary milestone. One-hundred fifty-five abstracts were received and reviewed by a panel of 26 judges. One-hundred twenty-five have been accepted for either oral or poster presentation.

Such success is due, of course to a large number of talented and dedicated people. We wish to acknowledge the participation of a group of faculty and thank them for volunteering their time and expertise to review the submissions. A panel of over 26 judges participated in the reviews. Each abstract was assigned based upon area of expertise. The judges' evaluations were critical in determining the oral presentations and poster presentations for this year's event.

In addition, it is my privilege to have worked with this year's Research Day organizing committee. This committee worked diligently over an extended period of time to endeavor to bring you an exceptional learning and networking opportunity. Members of this year's committee were:

Conner Holthaus	Courtney Puffer	Dale Vandre
Emma Swayze	Erik Larson	Greg Vanden Heuvel
Jessica Sassic	John Spitsbergen	John Winterholler
Krishna Jain	Laura Bauler	Leah Bader
Liz Lorbeer	Maria Demma Cabral	Maria Sheakley
Mariam Ischander	Maureen Owens	Melinda Abernethy
Nichol Holodick	Shanna Cole	Shivum Patel
Steve Crooks		

We hope this year's Research Day will inspire you to pursue your own research and to, as well, support the basic, medical and healthcare research of our Southwestern Michigan Community colleagues.

Gregory Vanden Heuvel, PhD
Chair 2019 Research Day

We'd like to thank the following WMed professionals who dedicated their time to participate as abstract scoring judges and/or session moderators for today's event.

Melinda Abernethy, MD	Mariam Ischander, MD	
Robert Baker, MD	Krishna Jain, MD	Jessica Sassic, M2
Laura Bauler, PhD	Richard Lammers, MD	Robert Sawyer, MD
Karen Bovid, MD	Erik Larson, PhD	Maria Sheakley, PhD
Maria Demma Cabral, MD	Mark Loehrke, MD	Neelkamal Soares, MD
Shanna Cole, PharmD	Liz Lorbeer, EdM	John Spitsbergen, PhD
Steven Crooks, PhD	Josh Mastenbrook, MD	Emma Swayze, M2
Bonny Dickinson, PhD	Tracey Mersfelder, PharmD	Greg Vanden Heuvel, PhD
Theo Gomes, MD	David Overton, MD	Kristi VanDerKolk, MD
Lisa Graves, MD	Maureen Owens	Dale Vandre, PhD
Nichol Holodick, PhD	Shivum Patel, M2	John Winterholler, M3
Conner Holthaus, M3	Courtney Puffer, MA	

WMED UPJOHN CAMPUS FLOOR PLANS

WMed Upjohn First Floor

WMed Upjohn Second Floor

<u>TBL Hall #1</u>

Oral Presentation Session A & D

<u>TBL Hall #2</u>

Oral Presentation Session B & E

<u>Classroom #111</u>

Oral Presentation Session C & F

<u>HALLWAYS (First and Second Floor)</u>

Poster Displays

<u>LOBBY (Front and Back)</u>

Check-in

Vendor Tables

<u>AUDITORIUM</u>

Keynote Speaker

<u>CATERING KITCHEN</u>

Appetizers (4/16/19)
Breakfast (4/17/19)

SCHEDULE

Tuesday, April 16th, 2019
5:00 p.m. – 8:00 p.m.
WMed Upjohn Campus
300 Portage Street
Kalamazoo, MI 49007

4:30 – 5:00pm	**Check-in** **Refreshments available** **Poster Presenters – please arrive early to find your poster**	**1st Floor Lobby (Front and Back Door)**
5:00 – 8:00pm	**Poster Presentation Session**	
	Clinical Research Posters	**1st Floor Lobby/Hallways**
	Medical Education, Basic Science & Community and Population Health Research Posters	**2nd Floor Lobby/Hallways**

SCHEDULE

Wednesday, April 17th, 2019
8:00 a.m. – 12:00 p.m.
WMed Upjohn Campus
300 Portage Street
Kalamazoo, MI 49007

8:00 – 8:30am	**Check-in** **Refreshments available**	**1st Floor Lobby** **(Front and Back Door)**
8:30 – 9:30am	**Oral Presentation Session 1**	
	Session A	**TBL Hall #1**
	Session B	**TBL Hall #2**
	Session C	**Classroom #111**
9:30 – 9:45am	**Break**	
	Oral Presentation Session 2	
9:45 – 10:45am	**Session D**	**TBL Hall #1**
	Session E	**TBL Hall #2**
	Session F	**Classroom #111**
10:45 – 11:00am	**Break**	
11:00 – 12:00pm	**Keynote Speaker**	**Auditorium**
12:00pm	**Farewell**	**Auditorium**

KEYNOTE SPEAKER

The Dr. Robert P. Carter Research Lecture

This is the eleventh year of this annual lecture supported by the Board of Western Michigan University Homer Stryker M.D. School of Medicine to celebrate the Research Day activities and to recognize Dr. Carter's commitment and support of research.

James DuBois, PhD, ScD

Steven J Bander Professor of Medical Ethics and Professionalism, Professor of Psychology, Professor of Medicine, Director of the Center for Clinical and Research Ethics at Washington University School of Medicine

Presents:

Doing good research: Learning from the mistakes and successes of others

James DuBois is the Steven J. Bander Professor of Medical Ethics and Professionalism, Professor of Psychology and Professor of Medicine as well as the Director of the Center for Clinical and Research Ethics at Washington University School of Medicine in the Division of General Medical Sciences. He is an Adjunct Professor in the Albert Gnaegi Center for Health Care Ethics at Saint Louis University, where he was the inaugural Hubert Mäder Professor of Health Care Ethics and Director of the Bander Center for Medical Business Ethics. DuBois completed his PhD in philosophy at the International Academy of Philosophy in Liechtenstein and his DSc in psychology at the University of Vienna in Austria, where he focused on cross-cultural moral psychology. He directs the NIH-funded Professionalism and Integrity Program (PI Program), which offers personalized assessments, a group workshop, and post-workshop coaching calls to help researchers operate professionally in today's complex environments. He is the founding Editor (with Ana Iltis) of Narrative Inquiry in Bioethics: A Journal of Qualitative Research, published by Johns Hopkins University Press. He is a Board Certified Coach (BCC) specialized in career coaching for researchers.

DuBois directs the Professional and Social Issues Lab within the Department of Medicine, which conducts social science research aimed at understanding barriers and facilitators to research integrity and professionalism.

Oral Presentation Sessions

ORAL PRESENTATIONS

8:30 a.m. – 9:30 a.m.

SESSION A — TBL HALL #1

Moderator: Theo Gomes, MD; Medicine-Pediatrics

8:30-8:42 am **Effect of Long-term Exercise on GDNF Expression and Innervation in Rat Skeletal Muscle.** Alberto Cintron-Colon, BS; John Spitsbergen, PhD

8:42-8:54 am **Recovery of Olfactory Sensory Neurons After Damage Involves Changes in Proliferation Patterns.** Mamoon Ali, BS; Christine Byrd-Jacobs, PhD

8:54-9:06 am **The Potential Mutagenic Influence of Structural Element Variants Within the PKD1 Gene.** John Dewey, BS; Aaron Zebolsky, MS; Emma Swayze, MS; Erik Larson, PhD

9:06-9:18 am **Biophysical Analysis of Mutagenic DNA Structures in the Human PKD1 Gene.** Aaron Zebolsky, MS; Emma Swayze, MS; John Dewey, BS; Gloria Alvarado, PhD; Erik Larson, PhD

9:18-9:30 am **Loss of β-arrestin2 in D2 Cells Alters Neuronal Excitability and Behavioral Responses to Drugs of Abuse.** Kirsten Porter-Stransky, PhD; Alyssa Petko, BS; Saumya Karne; Cameron Liles, BS; Nikhil Urs, PhD; Marc Caron, PhD; Carlos Paladini, PhD; David Weinshenker, PhD

SESSION B — TBL HALL #2

Moderator: Mark Loehrke, MD; Internal Medicine

8:30-8:42 am **Pediatric Residents' Perceptions of Neonatal Abstinence Syndrome Training: An experimental study of Simulation versus Video.** Marisha Agana, MD; Duncan Vos, MS; Daniel Foley, BA; Mark Williams, BA; Hans Baumgartner, BS; Neelkamal Soares, MD

8:42-8:54 am **Orthopaedic Resident Opioid Prescribing Practices.** Christine Bowman, MD; Matthew Jaykel, MD; Joseph Weistroffer, MD

8:54-9:06 am **2017-2018 Acetyl Fentanyl Trends in South West Michigan: Is there a Larger Pattern?** Tong Li, BS; Jalynn Zou, BS; Erinn Ton, BS; Christine Stevens, BS; Elizabeth Douglas, MD; Prentiss Jones, PhD

9:06-9:18 am **Trends and 30-Day Readmission Rate for Patients Discharged with Congestive Heart Failure: Analysis of 2,352,612 Admissions.** Anandbir Bath, MD; Jasreen Kaur, MD; Vishal Gupta, MD

9:18-9:30 am **Barriers to Obtaining a Full Set of Vital Signs in the Emergency Department.** Kelly Halt, DO; Samantha Mix, MD; Thomas Olsen, DO; David King, MD; Fahad Khan, DO; Clay Mishler, MD; Paige Neaterour, MD; Jon Parker, DO; Brenton Kinker, MD; Elise Klesick, DO; Brendan Hayes, MD; Eric Hume, DO; Duncan Vos, MS; Daniel Foley, BA; Heather Rauch; Anita Bell; Rashmi Kothari, MD; Richard Lammers, MD

ORAL PRESENTATIONS

8:30 a.m. – 9:30 a.m.

SESSION C **CLASSROOM #111**

Moderator: Bonny Dickinson, PhD; Biomedical Sciences

8:30-8:42 am **The Words We Use: Identifying the Preferred Lexicon for Predictors of Physician Burnout.** Karen Horneffer-Ginter, PhD; Jeffrey Greene, PhD; Roger Apple, PhD; Lisa Graves, MD; Kristine Gibson, MD; Julia Tullio, BS; Adrienne Kaufman, MS

8:42-8:54 am **Longitudinal Effects of Introducing Mindfulness in Medicine for the Clinical Years of Medical School.** Christopher Stancic, BS; Rebecca Sigourney, BS; Mark Schauer, MD; Laura Bauler, PhD; Ellen Drosdick, BS; Robert Cai, BS

8:54-9:06 am **The Effect of an Interprofessional Stroke Simulation of Enhancing Medical and Allied Health Students' Knowledge of Professional Roles in Practice.** Gisella Newbery, MS; Diane Peirce, MD; Debra Lindstrom, PhD; Richard Lammers, MD; Cheryl Dickson, MD

9:06-9:18 am **Perceptions of Residents' Autonomy in the Operating Room.** Graham McLaren, MD; Zaki Rahaman, MD; Saad Shebrain, MD; Gitonga Munene, MD

9:18-9:30 am **Resident Knowledge and Residency Program Practices Regarding Pregnancy Testing and Prenatal Care Referrals within the Kalamazoo, MI Medical Community.** Arika Wieneke, BA; Walker Thompson, MS; David Wallington, MS; Cheryl Dickson, MD; Mark Schauer, MD

ORAL PRESENTATIONS

9:45 a.m. – 10:45 a.m.

SESSION D **TBL HALL #1**

Moderator: Lisa Graves, MD; Faculty Affairs & Family and Community Medicine

9:45-9:57 am **Patient and Provider Factors that Increase Disclosure of Psychosocial Problems.** Julia Tullio, BS; Jacob Lautze, BS; Deb Lenz, MA; Grace Lubwama, DPPD, MPH; Catherine Kothari, PhD

9:57-10:09 am **Mothers' Reported Knowledge of, Practices, and Barriers to Engaging in Infant Safe Sleep.** Amy Damashek, PhD; Cheryl Dickson, MD; Deb Lenz, MA; Grace Lubwama, DPPD, MPH; Catherine Kothari, PhD

10:09-10:21 am **An Analysis of Early Childhood Developmental Program Accessibility and Parental Desires: A Survey of Kalamazoo Northside Parents.** Kelsy Schultz, BA; Jeanne Oord, BA; Rachel Tomassi, BS; Shanika Lucas, BAS; Trina Jones, BA; Grace Lubwama, DPPD, MPH; Catherine Kothari, PhD

10:21-10:33 am **Assessing the Prevalence of Food Insecurity in a Walk-In HIV Testing/Services Center in Southwest Michigan.** Kailin Kuo, BA; Kevin Cates, MD; Ola Jandali, BS; Mariyam Sheidu, BS; Melissa Olken, MD, PhD

10:33-10:45 am **Patient-Provider Communication in the Kalamazoo Mom's Health Experiences Survey Study.** Rebekah Sharp, MD; Melinda Abernethy, MD, MPH; Alysa Hernandez, BS; Terra Bautista, BA; Grace Lubwama, DPPD, MPH; Catherine Kothari, PhD

SESSION E **TBL HALL #2**

Moderator: Roua Azmeh, MD; Pediatric & Adolescent Medicine

9:45-9:57 am **Predictors of and Mortality from Resistant Infections in ICU Patients.** Laura Stearns, DO; Robert Sawyer, MD

9:57-10:09 am **Is a Shorter Duration of Antibiotic Therapy Paradoxically Associated with More Resistant Secondary Infections in Randomized, Controlled Trials?** Cole Kircher, DO; Robert Sawyer, MD

10:09-10:21 am **Fecal Microbiota Transplantation for Recurrent Clostridiodes Difficile Infections.** Micah Rimpel; Dean Van Loo, PharmD

10:21-10:33 am **Pyomyositis in the United States – Trends and Associations from the Healthcare Utilization Project Nationwide Inpatient Sample Database.** Rheanne Maravelas, MD; Duncan Vos, MS; Neiberg Lima, MD; Sapna Sadarangani, MD; Thomas Melgar, MD

10:33-10:45 am **Brief Interventions with Patients with Cystic Fibrosis (CF) and Caregivers Who Score Symptomatically on the PHQ-9 and GAD-7.** Sheryl Lozowski-Sullivan, PhD; Andrea Caskey, LMSW; Niecia Anjorin, LMSW; Teresa Bailey, PharmD; Mireya Diaz, PhD; Laura Bauler, PhD; Sally Bonnema MS; Myrtha Gregoire-Bottex, MD

ORAL PRESENTATIONS

9:45 a.m. – 10:45 a.m.

SESSION F **CLASSROOM #111**

Moderator:	David Overton, MD; Resident Affairs & Emergency Medicine
9:45-9:57 am	**Analysis of B Cell Progenitors in Sickle Cell Disease.** Jesse Chou, BA; Nichol Holodick, PhD
9:57-10:09 am	**MicroRNA-200c Promotes Bone Regeneration by Targeting Sox2-Mediated WnT Signaling and KLF4.** Adil Akkouch, PhD; Steven Eliason, MS; Mason Sweat, MS; Miguel Romero-Bustillos, DDS; Min Zhu, PhD; Fang Qian, PhD; Brad Amendt, PhD; Liu Hong, MD, PhD
10:09-10:21 am	**Regeneration of Soft Tissues is Promoted by MMP1 Treatment After Digit Amputation in Mice.** Haiying Pan, BS; Yong Li, MD, PhD
10:21-10:33 am	**Determinants of FAIM Transcriptional Regulation.** Mekala Neelakantan, BS; Phillip Key, BS; Tom Rothstein, MD, PhD; Hiroaki Kaku, PhD
10:33am-10:45am	**FAIM Expression from Stress in Mice Spleens.** Phillip Key, BS; Mekala Neelakantan, BS; Tom Rothstein, MD, PhD; Hiroaki Kaku, PhD

Oral Presentation Abstracts

EFFECT OF LONG-TERM EXERCISE ON GDNF EXPRESSION AND INNERVATION IN RAT SKELETAL MUSCLE

Alberto Cintron-Colon, BS; John Spitsbergen, PhD

Western Michigan University, Biological Sciences

Exercise provides neuroprotection by promoting neurogenesis, decreasing apoptosis, and modulating inflammation; however, the mechanism is not well understood. GDNF is a neurotrophic factor that has been shown to be a potent survival factor for somatic motor neurons that innervate skeletal muscle, but GDNF levels in muscle decrease with aging. Our hypothesis is that long-term exercise will increase GDNF expression, and support NMJ structures. Adult Sprague-Dawley rats were exercised by voluntary running for 6 months. Age-matched sedentary group maintained in cages without access to running wheels served as controls. After 6 months, hind-limb muscles were collected and processed for GDNF protein content via ELISA. Motor end plates were stained with a-bungarotoxin, and anti-GDNF was used to detect GDNF. There was a significant increase in length of end plates in muscles from exercised rats (36.6 ± 3.5um), and a significant increase in area (616.3 ± 84.9um^2) of stained end plates in muscles from exercised rats compared to length (27.6 ± 1.15um) and area (430.3 ± 30.8um^2) of the control group. There was a trend towards an increase in GDNF protein content in muscle from exercised rats; however, the effect was not significant. Findings suggest that increased physical activity enhances structural neuroplasticity in NMJ elements and may possibly lead to enhanced neuromuscular function. Understanding the activity dependent regulation of neurotrophic factor expression and neural plasticity in the neuromuscular system may help in identifying novel targets for pharmacological development.

RECOVERY OF OLFACTORY SENSORY NEURONS AFTER DAMAGE INVOLVES CHANGES IN PROLIFERATION PATTERNS

Mamoon Ali, BS; Christine Byrd-Jacobs, PhD

Western Michigan University, Biological Sciences

The ability of lower vertebrates to regenerate entire organs is an intriguing phenomenon that has various beneficial implications for improving human health. Zebrafish have shared and conserved features with mammals, making them an ideal model to study regeneration. Intranasal irrigation with Triton X-100 produces severe degeneration of the olfactory epithelium, followed by rapid regeneration. We hypothesize that following chemical lesioning of the olfactory epithelium there will be changes in proliferation patterns that lead to recovery of the epithelium. Adult zebrafish were intraperitoneally injected with 50 □L/g body weight of BrdU, and the right naris was irrigated with TX-100. Anti-BrdU was used to label newly born cells. In control fish, scattered BrdU+ profiles were present deep in the epithelium of the trough region, with few profiles in the side regions of the olfactory organ. One day after TX-100 treatment, there was obvious thinning of the epithelium; many BrdU+ profiles were observed in the trough region, with very few in the side region. By three days, the epithelial thickness appeared to return to control level; BrdU+ profiles were observed at various levels of the olfactory epithelium in both the trough and side regions. This appears to be evidence of differentiation and migration of olfactory sensory neurons. At five and seven days, BrdU profile numbers were substantially diminished, even below controls levels. Further investigation will focus on understanding the mechanisms involved in regenerating neurons after damage, with an overall goal of facilitating recover from neurodegenerative diseases and traumatic brain injuries.

RECOVERY OF OLFACTORY SENSORY NEURONS AFTER DAMAGE INVOLVES CHANGES IN PROLIFERATION PATTERNS

John Dewey[1], BS; Aaron Zebolsky[2], MS; Emma Sawyze[2], MS; Erik Larson[3], PhD

[1]WMU Homer Stryker M.D. School of Medicine, MD Class of 2022; [2]WMU Homer Stryker M.D. School of Medicine, MD Class of 2021; [3]WMU Homer Stryker M.D. School of Medicine, Biomedical Sciences

In the autosomal dominant form of polycystic kidney disease (PKD), inheritance of a single mutation in the PKD1 gene is followed by somatic inactivation of the second allele, leading to cyst formation. Cysts can number in the thousands in affected kidneys, with each potentially having a different mutation. This reveals a high level of PKD1 mutagenesis, but the mechanisms are undefined. We have analyzed human PKD1 for sequence elements that may explain the higher level of somatic inactivation. Guanine repeats are of particular interest because they support four-stranded structures known as G-quadruplex (G4) DNA. G4 is a structure that leads to genetic instability, and is often found within oncogenic translocation hot spots, cancer genes, and at recombination sites. Inter-species comparisons show that species subject to autosomal dominant PKD, including humans, share a similar sequence bias. Guanine repeats are over-represented in human PKD1 and are found in tandem arrays within at least three introns. On the other strand, cytosine repeats argue for a potential to form i-Motif structures during transcription, which may contribute to gene regulation. G4 formation may directly contribute to PKD1 inactivation, as cataloged somatic mutations are clustered near predicted G4-forming motifs. G4 formation blocks polymerase activities, leading to DNA breaks and recombination, elevating inactivating mutagenesis risk. Our results not only provide a molecular rationale for ADPKD, but also identify a DNA structure within PKD1 that could be targeted for diagnosis or disease prevention

BIOPHYSICAL ANALYSIS OF MUTAGENIC DNA STRUCTURES IN THE HUMAN PKD1 GENE

Aaron Zebolsky[1], MS; Emma Sawyze[2], MS; John Dewey[2], BS; Gloria Alvarado[3], PhD, Erik Larson[4], PhD

[1]WMU Homer Stryker M.D. School of Medicine, MD Class of 2022; [2]WMU Homer Stryker M.D. School of Medicine, MD Class of 2021; [3]Illinois State University; [4]WMU Homer Stryker M.D. School of Medicine, Biomedical Sciences

Autosomal Dominant Polycystic Kidney Disease (ADPKD) is a severe but relatively common (1/500) renal disease. It results from an inherited mutation in one PKD1 gene, followed by a "second hit" mutation in the other normal gene leading to a cellular recessive mechanism. The PKD1 gene is prone to these somatic inactivation events, but the mutagenic mechanisms remain largely unknown. Bioinformatic analysis of PKD1 has revealed guanine repeat sequences capable of forming four-stranded structures known as G-quadruplex (G4) DNA, motifs involved with oncogenic translocations at other loci. We therefore tested the ability of these sequences to form G4 structures under physiological conditions. Circular Dichroism confirmed that guanine repeats within the human PKD1 gene fold into G4 DNA structures in vitro. This structure was abolished in control DNAs where the guanine repeats were disrupted via thymine substitution. G4 formation was observed for repeats located within large tandem arrays and also for more isolated G4 sequences. One G4 motif overlaps with a cataloged pathogenic deletion and analysis confirms that this sequence supports G4 formation. Our findings support the model that DNA structure formation within the human PKD1 gene contributes to an increase in genetic instability and the emergence of ADPKD. This work contributes to the discovery of suitable molecular markers that may be clinically useful in the diagnosis and prevention of polycystic kidney disease.

LOSS OF β-ARRESTIN2 IN D2 CELLS ALTERS NEURONAL EXCITABILITY AND BEHAVIORAL RESPONSES TO DRUGS OF ABUSE

Kirsten Porter-Stransky[1], PhD; Alyssa Petko[2], BS; Saumya Karne[3]; Cameron Liles[3], BS; Nikhil Urs[4], PhD; Marc Caron[5], PhD; Carlos Paladini[2], PhD; David Weinshenker[3], PhD

[1]WMU Homer Stryker M.D. School of Medicine, Biomedical Sciences; [2]University of Texas at San Antonio; [3]Emory University; [4]University of Florida; [5]Duke University

Drug abuse continues to be a major health crisis, with the opioid epidemic considered a public health emergency. Unfortunately, there is a paucity of effective pharmaceutical interventions to treat psychostimulant and opioid addictions. Previous work has shown that the protein β-arrestin2, which is involved in dopamine receptor internalization and signaling, alters certain drug responses; however, the cell-type specificity of these effects and whether β-arrestin2 can alter the rewarding effects of drugs was unknown. To fill in this gap, the present study generated mice lacking β-arrestin2 either in D1 or D2 dopamine receptor-containing cells, used slice electrophysiology to characterize the role of β-arrestin2 in these neurons' responses to dopamine, and tested the behavioral effects of cocaine and morphine in these mice. Eliminating β-arrestin2 in D2, but not D1, cells impaired electrophysiological responses to dopamine. While mice lacking β-arrestin2 in D1 neurons exhibited mostly normal drug responses, mice lacking β-arrestin2 in D2 cells showed dose-dependent reductions in acute locomotor responses to cocaine and morphine, attenuated locomotor sensitization to cocaine, and blunted cocaine reward measured with conditioned place preference. Together, these results indicate that D2-derived β-arrestin2 is critical for the ability of dopamine to inhibit D2 neurons and modulates multiple behavioral responses to psychostimulants and opioids. β-arrestin2 may be a beneficial target for future pharmacotherapies in the treatment of addiction.

PEDIATRIC RESIDENTS' PERCEPTIONS OF NEONATAL ABSTINENCE SYNDROME TRAINING: AN EXPERIMENTAL STUDY OF SIMULATION VERSUS VIDEO

Marisha Agana[1], MD; Duncan Vos[2], MS; Daniel Foley[3], BA; Mark Williams[4], BA; Hans Baumgartner[4], BS; Neelkamal Soares[1], MD

WMU Homer Stryker M.D. School of Medicine, Pediatric & Adolescent Medicine; WMU Homer Stryker M.D. School of Medicine, Epidemiology & Biostatistics; Ascension Clinical Research Institute; WMU Homer Stryker M.D. School of Medicine, Simulation Center;

BACKGROUND: Neonatal Abstinence Syndrome (NAS) is characterized by significant physiological and behavioral symptoms involving multiple organ systems in neonates following a prenatal exposure to opioids and other non-opioid drugs. NAS can have serious morbidity, and even death, if unrecognized and untreated. This study developed a simulation model of a standard video training of the Finnegan NAS Scoring System and investigated the perceptions of comfort and competency of pediatric residents undergoing video or simulation training.

METHODS: Thirty-one pediatric and medicine-pediatric residents participated in this single blinded randomized intervention study. The experimental group completed demonstrated simulation while the control group received the traditional video instruction. Both groups completed FNAS scoring on a case of a neonate with NAS. The FNAS scores of residents were compared to the scores of two expert raters. Pre- and post-training and preference surveys were obtained from all participants.

RESULTS: Both experimental and control groups scored the FNAS scenario similarly and were also similar to the expert raters. Both groups also reported comparable levels of comfort and competency after the training, though first year residents reported greater improvement than upper level residents. The FNAS scores from expert raters were identical for the simulation and video scenarios.

CONCLUSION: Simulation training of NAS scoring can be developed to the same fidelity as an established video format and engender the same level of comfort and competence. Opportunities exist for increasing interactive simulation methods and training medical professionals in an interdisciplinary manner using simulation on the FNAS scoring tool.

ORTHOPAEDIC RESIDENT OPIOID PRESCRIBING PRACTICES

Christine Bowman, MD; Matthew Jaykel, MD; Joseph Weistroffer, MD

WMU Homer Stryker M.D. School of Medicine, Orthopaedic Surgery

BACKGROUND: The U.S. opioid epidemic has become a recent focus for public health treatment and prevention strategies. Orthopaedic surgeons prescribe more narcotics than physicians in any other specialty. No study has yet examined the prescribing practices of orthopaedic surgery residents. Characterization of current resident prescribing habits could help in the implementation of educational programs and guidelines.

PURPOSE: To quantify opioid prescribing practices by orthopaedic surgery residents nationally and to identify influential factors.

METHODS: Orthopaedic surgery residents nationally were polled via a REDCap electronic survey distributed to the program coordinators and chief residents of U.S. accredited orthopaedic surgery residency programs beginning in November 2018. The survey consisted of questions regarding the number of opioids prescribed following seven common orthopaedic surgery procedures, as well as a series of questions regarding the residents' PGY level, training program (academic versus community), and their own perspective on their prescribing practices.

RESULTS: 35 residents from 12 states have responded so far. Preliminary data analysis demonstrates that the highest mean number of opioids are prescribed after spinal fusion surgery (52 pills) and the lowest after upper extremity soft tissue procedures (10 pills). Higher rates of opioid prescribing are associated with academic residency programs, PGY level 2, and lack of a state prescription monitoring program. All respondents indicated that they believed educational guidelines regarding prescribing practices would be helpful.

CONCLUSIONS: Opioid-prescribing practices of orthopaedic surgery residents are influenced by program type, PGY level, and presence of a state opioid monitoring program.

LEVEL OF EVIDENCE: Level IV case series.

2017-2018 ACETYL FENTANYL TRENDS IN SOUTHWEST MICHIGAN: IS THERE A LARGER PATTERN?

Tong Li[1], BS; Jalynn Zou[1], BS; Erinn Ton[1], BS; Christine Stevens[1], BS; Elizabeth Douglas[2], MD; Prentiss Jones[3], PhD

WMU Homer Stryker M.D. School of Medicine, MD Class of 2021; WMU Homer Stryker M.D. School of Medicine, Pathology; WMU Homer Stryker M.D. School of Medicine, Biomedical Sciences

BACKGROUND: Acetyl fentanyl is a synthetic fentanyl analog with no approved medical use and 16 times the potency of morphine. It was first reported in 2013, with outbreaks being reported across the United States and Europe at varying concentrations.

OBJECTIVE: This paper explores current trends of acetyl fentanyl in southwest Michigan.

MATERIALS AND METHODS: A study was conducted using WMed Swift Toxicology of Opioid-Related Mortalities (STORM) data on southwest Michigan decedents with acetyl fentanyl (9/1/2017- 9/30/2018). External laboratory results were used to ascertain quantitative levels of those drugs. Subset analysis was performed comparing before (group A) and after (group B) the midpoint of study.

RESULTS AND DISCUSSION: 38 patients fit the method criteria, but two did not have quantifiable levels of fentanyl. In group A (n=13), the mean acetyl fentanyl was 1.67 ng/mL (range 0.05- 6.00 ng/mL median: 1.5ng/mL). In group B (n=25), the mean acetyl fentanyl was 7.66 ng/mL (range 0.14 - 21.57 ng/mL median: 6.72ng/mL). Group B had significantly higher acetyl fentanyl levels with an odds ratio of 6.87 (3.87-9.87) $p < 0.01$. There was no difference in fentanyl levels (mean 16.28 ng/mL ± 19.34), which is similar to that reported in a 2015-2017 study done in Wayne County, MI (5.61 ng/mL ± 6.05).

CONCLUSION: The data suggest an increasing trend in the occurrence and concentration of acetyl fentanyl in Southwest Michigan, which is concerning because of its high potency. Longer studies are needed to look at acetyl fentanyl trends over time.

TRENDS AND 30-DAY READMISSION RATE FOR PATIENTS DISCHARGED WITH CONGESTIVE HEART FAILURE: ANALYSIS OF 2,352,612 ADMISSIONS

Anandbir Bath[1], MD; Jasreen Kaur[1], MD; Vishal Gupta[2], MD

[1]WMU Homer Stryker M.D. School of Medicine, Internal Medicine; [2]Borgess Medical Center, Cardiology

INTRODUCTION: Congestive heart failure (CHF) is a major cause of morbidity and mortality in USA with a huge economic burden on health care and is associated with a high re-admission rate (RR). This study was done to determine demographic parameters associated with high RR secondary to CHF.

METHODS: Nationwide Inpatient Sample data was used to extract data of patients discharged with Congestive heart failure for year 2012-2014 using clinical classification software (CCS) of 108, corresponding to ICD 9 codes of 398.91, 428.0, 428.1, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9. NIS represents 20% of all hospital data in US. All the patients who were discharged with primary diagnosis of CHF and readmitted within 30 days were identified and categorized based on admitting diagnosis. Patients were classified as readmissions secondary to CHF as a primary cause, readmissions with CHF as a secondary cause and non-CHF associated readmissions. Chi-square analysis was done for statistical significance.

RESULTS: We identified a total of 2,352,612 admissions for CHF nationwide during the study period with total 30-day RR of 53.5%. 30-day RR for CHF as primary diagnosis accounted for 8.5%. Age group (18-44), males, patients under Medicaid and living in metropolitan areas had higher 30-day RR secondary to CHF as a primary cause and non-CHF related causes ($p<0.01$).

CONCLUSION: Our study identifies the demographic parameters associated with high 30-day readmission rate for Congestive heart failure. It reveals that CHF is associated with high 30-day RR. Strategies to reduce morbidity and healthcare cost should be targeted more in these groups with high RR.

BARRIERS TO OBTAINING A FULL SET OF VITAL SIGNS IN THE EMERGENCY DEPARTMENT

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INTRODUCTION: Vital signs are essential in the evaluation of patients in the Emergency Department (ED), yet they may be incompletely measured or recorded. The objective of this study was to identify perceived barriers to collecting and entering vital signs at the ED triage station within 10 minutes of patient arrival.

METHODS: Anonymous paper surveys consisting of demographic questions and a ranking matrix for 13 items were administered to nurses and technicians at one hospital ED. Data were entered in REDCap and analyzed in SAS v9.4. Categorical data was reported as frequency (percent). Unranked items were scored as 13, and the average of the ranks were ordered from greatest perceived barrier to least as identified by average rank.

RESULTS: Thirty-nine usable survey responses were returned (response rate = 39%). Sixty-four percent of respondents were nurses and 36% were technicians. The most frequently ranked responses were: 1) the patient was uncooperative with attempts to obtain vital signs or with the triage process (74%); 2) missing or broken equipment (59%); and 3) the patient was too ill or injured to complete vital signs (49%). Seventy-four percent reported collecting a full set of vital signs for more than 80% of patients triaged.

DISCUSSION: We identified the most frequent barriers to obtaining vital signs within ten minutes of patient arrival in the ED. The most common perceived barrier was uncooperative patients. This information can be used to direct future interventions that improve complete, early acquisition of vital signs in the ED.

THE WORDS WE USE: IDENTIFYING THE PREFERRED LEXICON FOR PREDICTORS OF PHYSICIAN BURNOUT

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In response to national concerns about physician burnout, many medical schools have been initiating wellness programming focused on both individual and institutional factors. A key to the success of these efforts is having sufficient buy in from student and faculty audiences. As advocated in other contexts, having members of an educational community share responsibility for creating a lexicon can increase investment and motivation. Individual engagement is especially important when it comes to several predictors of burnout that have often been ignored within the traditional "iron doc" culture of medicine. Focus-group methodology was used to gather information regarding preferred language for the terms self-care, self-compassion, and self-disclosure regarding difficult emotions. Thematic analysis using grounded theory was used to analyze transcriptions from faculty (n=12) and student (n=9) groups, revealing a strong favoring of alternative language compared to phrases commonly used in the wellness literature. For example, personal well-being was preferred over self-care, self-kindness was preferred over self-compassion, and sharing emotions and processing feelings were preferred over disclosing emotions. Students tended to prefer more formal phrases than did faculty. The favoring of terms that differ from those used in wellness research suggests that interventions designed to improve burnout conditions should not be developed strictly from the literature, but rather, need to be crafted to meet the needs of the local community, including preferred lexicon. As shown by this work, lexicon focus groups may be a valuable initial step for medical schools endeavoring to create and implement physician burnout interventions and learner wellness curricula.

LONGITUDINAL EFFECTS OF INTRODUCING MINDFULNESS IN MEDICINE FOR THE CLINICAL YEARS OF MEDICAL SCHOOL

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The shift from classroom-learning to clinical medicine, experienced by medical students during their third year, can be extremely stressful, and often has detrimental effects on physical and mental well-being. Mindfulness based stress reduction (MBSR) programs, with even a modest level of usage, have been shown to improve stress management, however the impact of MBSR on medical student populations is less well studied. The objective of this study was to determine if exposure to stress relief techniques during the third year of medical school would reduce student stress and anxiety levels. A mandatory one-hour MBSR training was conducted prior to the third year clerkships, introducing mindfulness and guided meditation. A MBSR session was then offered during each clerkship. Voluntary REDCap surveys using the Perceived Stress Scale and General anxiety disorder scale were administered every clerkship to evaluate the impact of stress relief on student perceived stress and anxiety. Preliminary results suggest that anxiety and perceived stress did not decrease. Meditation was the least utilized stress-coping method by students. Attendance at group MBSR sessions was low, due to perceived lack of time. A major barrier to stress and anxiety reduction is limited student engagement, which hampers the effectiveness of any stress relief technique. In a culture that promotes being busy, it is challenging to find time for stress relief, however overcoming this hurdle has been shown to have positive benefits on well-being. Incorporating time-management techniques into a mindfulness curriculum may improve the impact of MBSR.

THE EFFECT OF AN INTERPROFESSIONAL STROKE SIMULATION ON ENHANCING MEDICAL AND ALLIED HEALTH STUDENTS' KNOWLEDGE OF PROFESSIONAL ROLES IN PRACTICE

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BACKGROUND: Medical, occupational therapy (OT) and speech language pathology (SLP) students participated in a simulation on management of a patient with stroke. This simulation required cooperation between participants to work together as a team to communicate and make recommendations for post-stroke care.

OBJECTIVE: IRB approval was obtained to study whether the participants increased understanding of the roles and responsibilities of physicians and allied health professionals in patient management after the event.

METHODS: The intended learners for this simulation included 21 OT, 25 SLP, and 67 medical students; no controls were used. A pre-and post-test was administered and results analyzed to determine the effectiveness of the simulation.

RESULTS: The Wilcoxon Signed Rank (WSR) test indicates that the effect of the simulation on the change in number of correct responses from pre-to post is significant ($p=0.0155$) at the 0.05 level for the medical students. For OT and SLP students, the WSR test indicates the simulation is not significant ($p=0.3984$) and ($p=1.000$), respectively at the 0.05 level.

CONCLUSION: Medical students had statistically significant improvements on their posttests; OT and SLP students did not. This simulation provides a valuable, effective tool for enhancing medical students' knowledge of healthcare roles. Future research includes exploring whether or not there were any positive effects from the simulation on OT and SLP students and assessing interprofessional team communication.

PERCEPTIONS OF RESIDENTS' AUTONOMY IN THE OPERATING ROOM

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OBJECTIVE: Graded autonomy is an essential component of General Surgery training. This study compares perceptions of autonomy between residents and faculty in the operating room.

METHODS: Operative procedures performed by general surgery residents between July 2016 and June 2018 were each assigned an autonomy score by the operating surgeon and the surgical resident using the Zwisch score. The degree of agreement between the residents' self-evaluated measure of autonomy and surgeons' evaluation of resident autonomy was assessed.

RESULTS: Over the study period, 23 faculty members and 24 residents scored 546 operative cases (total 1,092 evaluations) using the Zwisch scale. About half of these evaluations were completed by PGY5 (24.4%) and PGY2 (24.2%), while the rest were completed by PGY1 (16.3%), PGY3 (21.1%) and PGY4 (14.1%). Overall, there was moderate agreement between resident and faculty evaluation with intraclass correlation coefficient of 0.50 (95% CI 0.41, 0.58). PGY5 and PGY1 residents appeared to have more agreement with the faculty (0.51, 0.50 respectively) than PGY2 (0.39), PGY3 (0.37) and PGY4 (0.31) residents. Spearman correlation between ranks of resident and faculty evaluations of resident autonomy was 0.31 ($p<0.001$). Agreement did vary by type of case.

CONCLUSIONS: Surgical faculty and residents appear to share similar perceptions of autonomy in the operating room. Greater degree of agreement was noticed at PGY5 and PGY1 levels.

RESIDENT KNOWLEDGE AND RESIDENCY PROGRAM PRACTICES REGARDING PREGNANCY TESTING AND PRENATAL CARE REFERRALS WITHIN THE KALAMAZOO, MI MEDICAL COMMUNITY

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BACKGROUND: Kalamazoo County (KC) has a significantly higher rate of infant mortality than the state of Michigan as a whole, with large disparities between black and white infants.

While causation is multifactorial, a contributing factor is lack of access to first trimester prenatal care. In 2015, only 64.3% of pregnant women in KC received first trimester care compared to 73.4% in the entire state. The first step for improvement is to assess the referral process for women who receive a positive pregnancy test at local emergency departments and outpatient clinics.

METHODS: REDCap surveys were emailed to WMed residents in emergency medicine (EM), internal medicine (IM), medicine-pediatrics (MP), pediatrics (P), and family medicine (FM) to assess knowledge of institutional protocol for pregnancy testing and prenatal care referrals. We also conducted semi-structured interviews with department leaders to determine their current protocols.

RESULTS: 60 survey responses were collected: 20 EM (33% response rate), 12 FM from FHC (50% response), and 28 combined Oakland drive primary care: IM, MP, P (38% response). Overall results showed a near 50-50 split on residents being aware of a protocol or not (Q1). Responses to questions 2 and 3 showed uncertainty involving patient education and referral protocols.

CONCLUSIONS: There is uncertainty regarding the existence of protocols for when to order a pregnancy test as well as what processes to implement upon receiving positive test results. Review of institutional protocols, and educating residents regarding this, should be undertaken to help improve prenatal care rates in KC.

PATIENT AND PROVIDER FACTORS THAT INCREASE DISCLOSURE OF PSYCHOSOCIAL PROBLEMS

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BACKGROUND: Psychosocial risks such as domestic violence (DV), mental illness (MH) and substance abuse (SA) are common and harmful to health, especially during pregnancy. Both providers and patients face multiple barriers to disclosure.
Goal. Describe rates of prenatal disclosure and the factors associated with disclosure.

METHODS: The Mom's Health Experiences study is a prospective mixed-methods study of 244 women recruited during their postpartum hospital stay. Based upon their phone survey responses and prenatal medical records, participants were categorized into: (1) Do NOT have problem, (2) Problem, but not disclosed, (3) Problem, disclosed. "Problems" were defined using validated screeners (DV, MH, SA). Disclosure was defined as medical record documentation of a positive result. Demographic and provider predictors were assessed using logistic regression.

RESULTS: In total, 57.3% (140 of 244) of women screened positive for one or more problems: 38.5% prenatal depression (MH), 28.7% past-year problem drinking (SA), 5.3% DV. Most (41.3%) had a single problem, but 13.5% had two problems and a couple (0.8%) had all three problems. Disclosure rates varied by problem type, and were highest for MH (51.1%), followed by DV (38.5%) and lowest for SA (11.4%). Logistic regression revealed two factors that increased disclosure: having multiple problems (aOR 2.40, CI 1.08 & 5.38, p=.033), and having lower income (aOR 2.17, CI 1.06 & 4.37, p=.033). Provider factors (medical home, primary care provider, provider relationship) were not significantly associated with disclosure.

CONCLUSION: Disclosure of psychosocial problems, which are common among pregnant women, was more related to patient circumstances than to provider characteristics.

MOTHERS' REPORTED KNOWLEDGE OF, PRACTICES, AND BARRIERS TO ENGAGING IN INFANT SAFE SLEEP

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BACKGROUND: Infant mortality is a serious public health problem in the U.S.; the infant mortality rate in the U.S. is higher than 25 comparably developed nations (MacDorman et al., 2014). Sleep-related deaths are one of the most common causes of death during infancy, and infants of color are more likely than are white infants to die as a result of such deaths. Although the American Academy of Pediatrics has published guidelines for safe sleep practices, families may experience barriers to following these guidelines.

PURPOSE: This study examined community mothers' knowledge of, reported practices, and barriers to following safe sleep guidelines in Kalamazoo.

METHODS: At 2 months postpartum, 272 women were surveyed via telephone about their safe sleep knowledge and practices as well as barriers to engaging in safe sleep.

RESULTS: Most women (95%) reported following at least three of the safe sleep guidelines; however, 14% reported engaging in cosleeping. With regard to safe sleep knowledge, the most common guidelines recalled were placing a child on their back (90%) and putting nothing in the sleeping space with the baby (74%). Fewer mothers noted the importance of placing a baby in a crib or pack-and-play (48%) or sleeping alone (39%). The most common reported barrier to engaging in safe sleep was placing the baby to sleep alone (71%).

CONCLUSIONS: Refraining from cosleeping is the most common safe sleep guideline that mothers have difficulty following in our local community. Interventions should help mothers problem solve barriers to placing babies to sleep alone.

AN ANALYSIS OF EARLY CHILDHOOD DEVELOPMENTAL PROGRAM ACCESSIBILITY AND PARENTAL DESIRES: A SURVEY OF KALAMAZOO NORTHSIDE PARENTS

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BACKGROUND: During early childhood, the brain establishes capacity for cognitive, motor, emotional, and language development. Out of an estimated 621 children ages 0-4 in Northside Kalamazoo, only 54 children were enrolled in health and education programs.

PURPOSE: The goal of this study is to identify what programs would be most beneficial, how to connect parents with programs, and what barriers exist.

METHODS: This study is a retrospective secondary analysis of anonymous questionnaires conducted by the YWCA-Kalamazoo. A sample of 69 parents/caregivers of children ages 0-4 living in Northside Kalamazoo neighborhoods participated, providing brief written responses to six open-ended questions. Thematic analysis was completed using, first, categorization and, second, thematic coding across categories. Themes were validated using cross-coder consensus.

RESULTS: Currently, 90% of parents identified they would like programs, information, and support while only 39.1% of families are participating in a program. Parents chiefly desire social support (45%) and programs centered on education (40.5%), child care (37.7%), and health/development (26.1%). Parents cite multiple barriers including program factors (34.8%), transportation (24.6%), and finances (23.2%).

CONCLUSION: Efforts to improve access to enrichment programs for young children on the Northside need to utilize a community-based approach, integrate high-quality childcare, and address logistical barriers to access. Evidence based interventions that accomplish these goals include: home visitation and group-based parenting programs for 0-2 year olds, high quality center-based preschool with wrap-around supports for 3-to-4 year-olds, and full-day Kindergarten for 5-year-olds.

ASSESSING THE PREVALENCE OF FOOD INSECURITY IN A WALK-IN HIV TESTING/SERVICES CENTER IN SOUTHWEST MICHIGAN

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OBJECTIVE: The primary objective of this study is to assess the prevalence of food insecurity in a population of patients and clients seeking services at CARES (community AIDS Resource and Education Services), a walk-in HIV testing center.

INTRODUCTION: Food insecurity disproportionately affects low-income individuals, communities of color, individuals with and at risk of chronic disease, and Lesbian, Gay, Bisexual, and Transgender communities. This cluster of identities closely mirrors the demographic clusters at highest risk of acquiring HIV.

METHODS: Clients of CARES at Kalamazoo and Benton Harbor locations responded to a three-question screener assessing for food insecurity, in addition to providing demographic data in clinical intake paperwork. The validated 2-item screener (Hager et al) is used to identify individuals at risk for food insecurity with a 97% specificity. A third question was added to assess for whether a patient is already utilizing services to address food insecurity. The frequency and 95% confidence interval of those who are food insecure is reported.

RESULTS: Responses from 56 participants represented 29 different zip codes in Southwest Michigan. Ages ranged from 18 to 68 years with an average (standard deviation) of 38 (13) years. The majority of the respondents, 42 (75%), were cisgender male, while 13 (23%) cisgender female, and 1 (2%) transgender. Responses to the validated 2-question food insecurity screening tool by Hager et al indicate that 51.8% (95% CI .38, .65) are food insecure.

CONCLUSION: More than half of clients seeking services at CARES indicated food insecurity.

PATIENT-PROVIDER COMMUNICATION IN THE KALAMAZOO MOM'S HEALTH EXPERIENCES SURVEY STUDY

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BACKGROUND: Here in Kalamazoo, and across the nation, patient-provider miscommunication and disrespectful treatment is cited as a common experience, especially for disadvantaged patients.

OBJECTIVE: The aim of this study was to evaluate postpartum patients' communication with their healthcare provider.

METHODS: This was a secondary analysis of the "Mom's Health Experiences Survey Study," an observational mixed-methods study utilizing medical record data and a thirty-minute telephone-interview 2-4 months after delivery. Questions utilized validated measures of medical home, patient-provider communication, empowerment and respect. Pearson Chi Square analysis was completed using SPSS.

RESULTS: Of the 244 women surveyed, 93% reported a medical home, and approximately 50% could name a primary provider. Both were more common for privately-insured participants, who tended to be white women (70%) vs women of color (29%). Only 7% women of color with Medicaid utilized a primary care provider. Compared to women on Medicaid, women with private insurance felt that it was easier to express negative feelings, believed that they were part of the decision-making process, and felt that they worked well with their provider. There were no significant differences between type of insurance and ability to understand medical instructions or sense of respect. However, both were improved among women with an identified primary care provider.

CONCLUSION: Women of color without private insurance are less likely to identify a primary provider in the postpartum setting. The lack of a primary care provider is associated with impaired provider relationships and quality of communication and is an area of potential intervention and improvement.

PREDICTORS OF AND MORTALITY FROM RESISTANT INFECTIONS IN ICU PATIENTS

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BACKGROUND: Resistant infections are a source of healthcare utilization and cost. We hypothesized that the risk factors for resistant Gram-negative rods (rGNR), resistant Gram-positive cocci (rGPC), and fungal infections would be similar in a cohort of ICU-acquired infections.

METHODS: Data were collected on patients requiring intensive care from 1997 to 2017 in a single university surgical-trauma ICU. Patients with ICU-acquired infections were analyzed, conditioned on the presence of rGNR, rGPC, or fungi. Continuous variables were compared using Student's t-test and categorical variables were compared using the chi-square test. Independent predictors of the presence of a resistant pathogen and mortality were determined by logistic regression analysis.

RESULTS: 4319 ICU-acquired infections were identified; 1998 were resistant and 2321 were non-resistant. Any resistant organism infection was significantly associated with female sex, non-trauma diagnosis, APACHE II score, liver disease, steroid use, any prior infection, and a prior resistant infection, but not days of prior antibiotic use (all $p \leq 0.02$, $C = 0.72$, H-L test = 0.001). Controlling for severity of illness and demographics, resistant infections were not associated with mortality compared to non-resistant infections (OR = 1.12, $p = 0.17$, $C = 0.74$, H-L test = 0.08).

CONCLUSION: The likelihood of rGNR infection appears to be most closely linked to recent antimicrobial exposure, while rGPC infection appears to be associated with totality of prior antimicrobial exposure. Fungal infections may not be associated with prior exposure. These findings suggest disparate mechanisms of dysbiosis for different classes of resistant pathogens.

IS A SHORTER DURATION OF ANTIBIOTIC THERAPY PARADOXICALLY ASSOCIATED WITH MORE RESISTANT SECONDARY INFECTION IN RANDOMIZED, CONTROLLED TRIALS?

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BACKGROUND: One theoretical benefit of shortening duration of antibiotic therapy for hospital-managed infections is decreased risk of resistant superinfections. We hypothesized that a review of randomized trials of duration of antibiotic therapy would demonstrate a lower rate of resistant secondary infections in patients with a shorter duration versus a longer duration of treatment.

METHODS: PubMed was searched for all clinical, controlled trials where randomization was used to determine duration of antimicrobial therapy in a population of hospital-managed infections. Resistant superinfections were defined as a documented resistant infection, other than the initial infection being treated, that occurred during or immediately after each study's designated treatment period.

RESULTS: Thirteen studies met criteria. Pneumonia was the most common infection, followed by intra-abdominal infections. A total of 5437 patients were included, 2685 in a short duration arm and 2752 in a long duration arm. Mean days of therapy were 6.7 days in the short duration arm and 10.5 days in the long duration arm. Despite receiving, on average, 3.8 fewer days of therapy, the short duration patients had increased resistant superinfections, 322/2685 patients (11.99%) versus 271/2752 patients (9.85%), $p = 0.011$ by chi-square analysis.

CONCLUSIONS: A shorter duration of antibiotic treatment in randomized, controlled trials unexpectedly appeared to be associated with a higher rate of resistant superinfections. It is possible that damage to the host microbiome occurs within the first few days of therapy and future emphasis should be placed on avoiding the initiation of any antibiotics where unnecessary rather than shortening therapeutic courses.

FECAL MICROBIOTA TRANSPLANTATION FOR RECURRENT CLOSTRIDIODES DIFFICILE INFECTIONS

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BACKGROUND: Clostridiodes difficile infections are the most common healthcare-associated infection in the United States. Initial episodes are treated with oral vancomycin, however, 1 in 4 patients will suffer from recurrent Clostridiodes difficile infections. Rates of relapse following treatment of recurrent Clostridiodes difficile infections increase with each subsequent failure of treatment, and has lead investigators to find a more effective therapy. The treatment guidelines for Clostridiodes difficile infections have recently been updated, and included fecal microbiota transplantation as a treatment therapy for multiple recurrent Clostridiodes difficile infections. Although fecal microbiota transplantation has been recently added to the treatment guidelines, its true effectiveness and potential for the treatment of Clostridium difficile infections remains unclear.

METHODS: A retrospective chart review of patients treated for recurrent Clostridiodes difficile infections with either fecal microbiota transplantation or oral vancomycin. The primary objective of this study was to determine if treatment recurrent Clostridium difficile infections with FMT or oral vancomycin results in less recurrent Clostridium difficile infections over a 10-week follow up period after treatment.

RESULTS: A total of 60 patients were analyzed in this study. Recurrent Clostridiodes difficile infections occurred in 3 (10.1%) patients treated with fecal microbiota transplantation and in 16 (50%) patients treated with oral vancomycin ($p < 0.01$). This resulted in an in an odds ratio of 0.12 (95% [CI], 0.03 to 0.48).

CONCLUSION: In patients with recurrent Clostridiodes difficile infections, treatment with fecal microbiota transplantation resulted in significantly less treatment failures than patients treated with oral vancomycin.

PYOMYOSITIS IN THE UNITED STATES – TRENDS AND ASSOCIATIONS FROM THE HEALTHCARE UTILIZATION PROJECT NATIONWIDE INPATIENTS SAMPLE DATABASE

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Pyomyositis is a spontaneous infection of skeletal muscle that can lead to abscess formation and sepsis. It was first recognized in tropical regions but is gaining recognition in temperate climates. The purpose of our study was to better describe the characteristics, risk factors, and trends of pyomyositis in the United States.

This study is a retrospective review of data from the Healthcare Utilization Project Nationwide Inpatient Sample Database from 2002-2014. We systematically searched all available ICD-9 codes for inclusion and exclusion criteria to identify cases of pyomyositis. We compiled lists of codes for expected co-occurrences, risk factors, causative organisms, and inpatient procedures. Each group was treated as a single entity for the purpose of analysis.

The database included a total of 100,790,900 discharges accounting for 482,872,274 weighted discharges with 13,011 pyomyositis cases accounting for 62,657 weighted cases. The proportion of discharges with pyomyositis has steadily risen from 0.0054% (95% CI 0.0047, 0.0061) in 2002 to 0.0209% (95% CI 0.0195, 0.0222) in 2014. Co-occurring deep tissue infections implying secondary pyomyositis were identified in 27% of cases, with the remaining majority representing primary pyomyositis. We found significantly higher rates of co-occurrence with HIV and diabetes mellitus. Staphylococcal followed by streptococcal species were the most common bacteria diagnosed. The rapid increase in pyomyositis cases represents a 3-4 fold increase over our 12 year study period. This study provides additional information about the demographics, frequency, regional distribution, co-occurring conditions, risk factors, inpatient procedures, and causative organisms from patients with pyomyositis in the United States.

BRIEF INTERVENTIONS WITH PATIENTS WITH CYSTIC FIBROSIS (CF) AND CAREGIVERS WHO SCORE SYMPTOMATICALLY ON THE PHQ-9 AND GAD-7

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WMU Homer Stryker M.D. School of Medicine, Pediatric and Adolescent Medicine; WMU Homer Stryker M.D. School of Medicine, Clinical Affairs; Ferris State University, College of Pharmacy; WMU Homer Stryker M.D. School of Medicine, Epidemiology and Biostatistics; Bronson Methodist Hospital, Dietetics

BACKGROUND: Initial screening of patients with cystic fibrosis (CF) and their caregivers showed approximately half of patients and caregivers experience symptomatic levels of anxiety and depression based on the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder (GAD-7). Brief interventions designed to reduce symptoms were implemented.

METHODS: CF patients aged 12 to adult, and caregivers were screened from 2016-2018. Symptomatic patients and caregivers (scores >5) were asked to discuss the symptoms endorsed, and whether or not they were receiving mental health services. Brief interventions (i.e., solution-focused) were discussed based on the presenting symptoms. Each of these interactions were detailed and later categorized: brief intervention (e.g., sleep hygiene, behavioral activation, supportive therapy, anxiety reduction, behavioral planning), discussing community therapeutic services, referrals, psychotropic medications, and education.

RESULTS: In the 30 months of screening, 603 total GAD-7 and PHQ-9 screens were completed. Sixty-six (66) individuals were screened with the GAD-7 and the PHQ-9, some were screened more than once. Patient screening improved to 86%. Of those patients and caregivers who scored symptomatically (10 and 27, respectively), brief interventions (n=55) were followed by a decrease in reported symptoms. Education decreased severity in 80% of patients and 29% of caregivers, while psychotherapy did the same in 50% of patients and 40% of caregivers.

CONCLUSION: These data suggest that brief interventions may contribute to decreased symptoms of anxiety and depression. Education seems to work in patients while psychotherapy may be required with caregivers. These data support the integration of behavioral health interventions into CF Clinics.

ANALYSIS OF B CELL PROGENITORS IN SICKLE CELL DISEASE

Jesse Chou, BA; Nichol Holodick, PhD

WMU Homer Stryker M.D. School of Medicine, MD Class of 2021; WMU Homer Stryker M.D. School of Medicine, Biomedical Sciences

Sickle Cell Disease (SCD) is a one of the most common hematological disorders affecting millions of people worldwide. One of the major causes of death for those with SCD is Streptococcus pneumoniae infection. Children with SCD are 600 times more likely to become infected with S. pneumoniae than healthy children. Despite current interventions such as prophylactic antibiotics and vaccination, pneumococcal infection still poses a great risk to sickle cell patients. The study of B-lymphocytes is of great importance when optimizing vaccination strategies, enhancing passive protection, and/or developing other treatments for mitigating infection in sickle cell patients. Herein, we utilize flow cytometry analysis to determine whether or not there are significant changes in either the number and/or phenotype of B cell progenitors present in the bone marrow of a mouse model of SCD as compared to healthy controls. Our results demonstrate a lower number of total bone marrow cells as well as alterations in the number of cells within the intermediate stages of B cell development in mice with sickle cell disease. The intermediate stages of B cell development lead to a mature B cell, which produces antibodies capable of fighting infection. An alteration in B cell development could alter the number of functional mature B cells available to fight infection. Thus, understanding B cell development in the sickle cell disease state will help drive the development of therapeutic strategies for antibody defense against S. pneumoniae infections and work towards improved outcomes in patients afflicted with sickle cell disease.

MICRORNA-200C PROMOTES BONE REGENERATION BY TARGETING SOX2-MEDIATED WNT SIGNALING AND KLF4

Adil Akkouch[1], PhD; Steven Eliason[2], MS; Mason Sweat[3], MD; Miguel Romero-Bustillos[4], DDS; Min Zhu[5], PhD; Fang Qian[5], PhD; Brad Amendt[2], PhD; Liu Hong[5], MD PhD

[1]WMU Homer Stryker M.D. School of Medicine, Medical Engineering; [2]University of Iowa, Center for Craniofacial Anomalies Research; [3]University of Iowa, Anatomy and Cell Biology; [4]University of Iowa, Periodontics; [5]University of Iowa, Iowa Institute for Oral Health Research

MicroRNA (miR)-200c functions in anti-tumorigenesis and mediates inflammation and osteogenic differentiation. In this study, we discovered that miR-200c was upregulated in human bone marrow mesenchymal stromal cells (hBMSCs) during osteogenic differentiation. Inhibition of endogenous miR-200c resulted in downregulated osteogenic differentiation of hBMSCs and reduced bone volume in the maxilla and mandible of a transgenic mouse model. Overexpression of miR-200c by transfection of naked plasmid DNA (pDNA) encoding miR-200c significantly promoted the biomarkers of osteogenic differentiation in hBMSCs, including ALP, RUNX-2, OCN, and mineral deposition. The pDNA encoding miR-200c also significantly enhanced bone formation and regeneration in calvarial defects of rat models. Additionally, miR-200c overexpression was shown to downregulate Sox2 and KLF4 by directly targeting 3'UTRs and upregulate the activity of Wnt signaling inhibited by Sox2. These results strongly indicated that miR-200c may serve as a unique osteo-inductive agent applied for bone healing and regeneration.

REGENERATION OF SOFT TISSUES IS PROMOTED BY MMP1 TREATMENT AFTER DIGIT AMPUTATION IN MICE

Haiying Pan, BS; Yong Li, MD PhD

WMU Homer Stryker M.D. School of Medicine, Medical Engineering

The ratio of matrix metalloproteinases (MMPs) to the tissue inhibitors of metalloproteinases (TIMPs) in wounded tissues strictly control the protease activity of MMPs and therefore regulate the progress of wound closure, tissue regeneration, and scar formation. Some amphibians (i.e. axolotl/newt) demonstrate complete regeneration of missing or wounded digits and even limbs; MMPs play a critical role during amphibian regeneration. Conversely, mammalian wound healing re-establishes tissue integrity, but at the expense of scar tissue formation. The differences between amphibian regeneration and mammalian wound healing can be attributed to the greater ratio of MMPs to TIMPs in amphibian tissue. Previous studies have demonstrated the ability of MMP1 to effectively promote skeletal muscle regeneration by favoring extracellular matrix (ECM) remodeling to enhance cell proliferation and migration. In this study, MMP1 was administered to the digits amputated at the mid-second phalanx of adult mice to observe its effect on digit regeneration. Results indicated that the regeneration of soft tissue and the rate of wound closure were significantly improved by MMP1 administration, but the elongation of the skeletal tissue was insignificantly affected. During digit regeneration, more multipotent progenitor cells, capillary vasculature and neuromuscular-related tissues were observed in MMP1 treated tissues; moreover, there was less fibrotic tissue formed in treated digits. In summary, MMP1 was found to be effective in promoting wound healing in amputated digits of adult mice.

DETERMINANTS OF FAIM TRANSCRIPTIONAL REGULATION

Mekala Neelakantan[1], BS; Phillip Key[1], BS; Tom Rothstein[2], MD PhD; Hiroaki Kaku[2], PhD

WMU Homer Stryker M.D. School of Medicine, Class of 2021; WMU Homer Stryker M.D. School of Medicine, Immunobiology

INTRODUCTION: Recent work by the WMed Center for Immunobiology demonstrated the ability of Fas Apoptosis Inhibitory Molecule (FAIM) to combat cellular stress.

OBJECTIVE: We sought to explore FAIM's transcriptional regulation for insight into when, where, and how FAIM is produced.

METHODS: Firefly Luciferase transcription reporters of varying lengths were created and tested in HEK 293T cell lines subjected to heat stress. Differences in reporter expression were monitored, and allowed identification of potential FAIM regulatory regions. Transcription factor candidates for the regions of interest were identified via two methods. First, UCSC's Genome Browser database provided candidates that show any binding to the FAIM gene, and potential binding sites were identified by comparing FAIM base pairs to the transcription factors' consensus binding sequences. Second, we used MEME-SUITE prediction software to identify additional transcription factor candidates.

RESULTS: Two regions on the FAIM gene, -250→+75 and +900→+1100, were determined to regulate transcription. The former acts as a promoter, especially after heat stress, and the latter works as a repressor. Genome Browser and MEME-SUITE allowed us to identify transcription factors that potentially bind these regions: JUND, RUNX3, and TEAD4.

DISCUSSION: This work points the way to elucidating FAIM regulation. The regions of interest will be subjected to chromatin immunoprecipitation assays to definitively assess the role of candidate transcription factors.

CONCLUSION
In this work, we have identified two regions of interest and corresponding candidate transcription factors that may be involved in regulating this novel gene that plays a role in the cellular stress responses.

FAIM EXPRESSION FROM STRESS IN MICE SPLEENS

Phillip Key[1], BS; Mekala Neelakantan[1], BS; Tom Rothstein[2], MD PhD; Hiroaki Kaku[2], PhD

WMU Homer Stryker M.D. School of Medicine, Class of 2021; WMU Homer Stryker M.D. School of Medicine, Immunobiology

INTRODUCTION: Fas Apoptosis Inhibitory Molecule (FAIM) is a protein that has been implicated as having an important role in cellular stress responses and acts to protect the cell from apoptosis.

OBJECTIVE: Given its role in opposing cellular stressors, we sought to determine whether the level of FAIM is constitutively present or responds to stress.

METHODS: We examined primary cells, placed under conditions of oxidative or heat stress. Cells were obtained from the spleens of two types of mice: a wild-type (WT) mouse, and a heterozygote mouse in which green fluorescent protein (GFP) is knocked-in to the FAIM locus. Single cell suspensions of splenocytes were exposed to oxidative stressors including hydrogen peroxide and menadione, or heat stress of 40℃ in a water bath. The exposures were provided for varying periods of time, and the total production of GFP was assessed using flow cytometry as an indication of FAIM locus activation, with WT mice acting as the negative control.

RESULTS: Exposure to high levels of oxidative and heat stress led to increased mean GFP expression in the cells for the next 48 hours by 35%. Complicating matters was a decreased survivability in the cells exposed to higher amounts of oxidative and heat stress.

DISCUSSION: These results indicate that FAIM does respond to oxidative and heat stress with upregulation. Future efforts will involve replicating these experiments with cell lines that are much less susceptible to impairment of viability.

Poster Presentations

POSTER PRESENTATIONS

BASIC SCIENCE RESEARCH POSTERS

1. **Microglial Proliferation Patterns Following Damage to the Olfactory Bulb in Adult Zebrafish.** Susanna Var, BS; Christine Byrd-Jacobs, PhD

2. **MMP1 Gene Transfer Enhances Myoblast Migration and Engraftment in mdx/SCID Mice.** Haiying Pan, BS; Kinga Vojnits, PhD; Thomas Liu, MD; Fanwei Meng, PhD; Lei Yang, PhD; Yigang Wang, MD PhD; Johnny Huard, PhD; Charles Cox, MD; Yong Li, MD PhD

3. **MicroRNA-200c Attenuates Periodontitis by Modulating Proinflammatory and Osteoclastogenic Mediators.** Adil Akkouch, PhD; Min Zhu, PhD; Miguel Romero-Bustillos, DDS; Steven Eliason, MS; Fang Qian, PhD; Aliasger Salem, PhD; Brad Amendt, PhD; Liu Hong, MD PhD

4. **Characterization and Biocompatibility of a Novel Bioink of Collagen and Hydroxyapatite.** Adil Akkouch, PhD; Robert Swenson, DDS MS; Amber Bates, PhD; Emily Lanzel, DDS MS; Kathy Walters, PhD; Liu Hong, MD PhD; Kim Brogden, PhD

5. **Attenuated Astrogliosis in the Olfactory Bulb of Adult Zebrafish After Repeated Peripheral Damage.** Jackson Scheib, BS; Christine Byrd-Jacobs, PhD

6. **The Injury Induced Population of Muscle-Derived Stem Cell-Like Cells.** Kinga Vojnits, PhD; Haiying Pan, BS; XD Mu, PhD; Yong Li, MD PhD

7. **The Homeodomain Protein Cux1 is Regulated by the Notch Signaling Pathway in the Developing Kidney.** Conner Holthaus, BS; Emmanuel Kumar, BS; Carol Carlton, BS; Greg Vanden Heuvel, PhD

8. **Reprogramming Myoblasts into Potent Stem Cells Through Injury Muscle Tissue Extracts.** Kinga Vojnits, PhD; Haiying Pan, BS; Xiaojing Dai, PhD; Fanwei Meng, PhD; Yong Li, MD PhD

COMMUNITY & PUBLIC HEALTH RESEARCH POSTERS

9. **Point-of-Care Ultrasound in the Amazon Jungle: A Case Series.** Anita Shallal, MD; Michael Reaume, MD; Zachary Rich, MD; Thomas Melgar, MD

10. **Differential Survival: Do Racial and Socioeconomic Disparities Persist Beyond "Poor Birth Outcomes"?** Angela Barreto, MD; Samuel Lai, MS; Jennifer Kim, BS; Jennifer Balun, BS; Duncan Vos, MS; Terra Bautista, MA; Deb Lenz, MA; Lisa Graves, MD; Catherine Kothari, PhD

11. **Neighborhood Social-Determinants-of-Health Risk and Access to Pediatric Care.** Jacob Baxter, BS; Cheryl Dickson, MD MPH; Colleen MacCallum, MS; Bandhan Dutta Ayon, MS; Kathleen Baker, PhD; Brent Yelton, BA; Catherine Kothari, PhD

12. **The EPIC Procedure for Pilonidal Disease-Endoscopic-Assisted Pilonidal Irrigation and Cleaning.** Jacob Baxter, BS; Jairo Espinosa, MD; Michael Leinwand, MD
(Clinical Research Poster)

13. **Unusual Presentation of Concomitant Appendicitis and Meckel's Diverticulitis from Meckel's Neuroendocrine Tumor.** Jacob Baxter, BS; Jairo Espinosa, MD; Sarah Larson, MD
(Clinical Research Poster)

14. **Trends in Opioid-Related Deaths in Kalamazoo County, Michigan.** Maria Magidenko; Prentiss Jones, PhD; Abigail Grande, MPH; Theodore Brown, MD

15. **The Influence of Homelessness on Goal Setting Among Participants of Kalamazoo's Fatherhood Case Management Program.** Patrick McCreesh, MS; Brent Yelton, BA; Derek Miller, BA; Terra Bautista, MSW; Debra Lenz, MA; Catherine Kothari, PhD
16. **A Quality Improvement Initiative to Remodel Medication Refill Processes in a Pediatric Cystic Fibrosis Clinic.** Teresa Bailey, PharmD; Laura Bauler, PhD; Alyssa Woodwyk, MS CAPM; Mireya Diaz, PhD; Myrtha Gregoire-Bottex, MD
17. **Addition of Pharmacist in a Pediatric Cystic Fibrosis Clinic.** Teresa Bailey, PharmD; Laura Bauler, PhD; Alyssa Woodwyk, MS CAPM; Mireya Diaz, PhD; Myrtha Gregoire-Bottex, MD
18. **Generation of a Socioeconomic Status Classifier from Kalamazoo County Postpartum Survey Responses.** Alyssa Woodwyk, MS CAPM; Mireya Diaz, PhD; Catherine Kothari, PhD
19. **A Stitch in Time Saves Nine: Untreated Perinatal Depression Hurts Future Generations.** Ruqiya Tareen, MD; Rajiv Tandon, MD

MEDICAL EDUCATION RESEARCH POSTERS

20. **Malignant Vasovagal Syncope Presenting with Seizure-Like Activity.** Justin Di Donato, MD; Josh Knudson, MD; Laura Marsh, DO; Mohiman Saffar, MD; Kristi VanDerKolk, MD: Lauren Vocke, DO
21. **A Palpable Pulsatile Radial Arterial Line Insertion Simulator.** Carleigh Zahn, DO; Thomas Melgar, MD; Aniruddha Paranjpe, MD
22. **Clinical Clues to Creutzfeldt-Jakob Disease.** Jay Patel, MD; Kevin Kunzer, MD
23. **Levothyroxine Associated Suicidal Overdose.** Lisa Gustafson, BS; Prentiss Jones, PhD; Joseph Prahlow, MD
24. **Prosocial Behavior of Medical Students: An Experiment Using the Trust Game.** Parker Crutchfield, PhD; Richard Brandt, BS; Rebecca Funk, BS; Tyler Gibb, PhD; Ryan Khalil, BS; Devin Schindler, JD; Duncan Vos, MS
25. **Creating a Point of Care Ultrasound Course for Medical Residents: A Model for Curriculum Development.** Zachary Rich, MD; Anita Shallal, MD; Jayne Barr, MD; Thomas Melgar, MD

CLINICAL RESEARCH POSTERS

26. **Caregiver Awareness of Genetic Testing for Autism Spectrum Disorder.** Aaron Zebolsky, MS; Duncan Vos, MS; Neelkamal Soares, MD
27. **Patient Misunderstanding of Findings Leads to Suicide.** Jack Stover, BA; Joseph Prahlow, MD
28. **Concurrent Osteochondroma and Synovial Chondromatosis of the Hip in the Absence of Multiple Hereditary Exostosis: A Case Report.** Guston Zervoudakis, MD; Tyler Snoap, MD; Jason Roberts, MD
29. **Saccular Aneurysm Rupture with Simultaneous, Non-Contributory Heroin Use.** Gordon Liu, BA; Theodore Brown, MD

30. **Coronary Artery Dissection Associated with Ascending Aortic Dissection.** Joshua Rarick, MS; Lucas Rich, BS; Joseph Prahlow, MD

31. **Maternal Death by Fire and Fetal Carboxyhemoglobin Level.** Nicole Lee, MS; Theodore Brown, MD

32. **The Immune Function of a Patient with ITCH E3 Ubiquitin Ligase Deficiency.** Alexander Paschke, BA; Shivum Patel, BA; Adil Khan, BS; Ahmed El-Isa, MD; Patrick Jones, MD; Myrtha Gregoire-Bottex, MD; Roua Azmeh, MD

33. **A Curious Case of Conversion Disorder.** Grace Walter, BA; Ruqiya Tareen, MD

34. **A Pilot Without a Plane: A Case of Pseudologia Fantastica.** Darren Almagro, DO; Ruqiya Tareen, MD

35. **Lateral Proximal Physeal Tethering as an Alternative to Epiphysiodesis Used with Hemiplateau Elevation Osteotomy to Treat Infantile Blount Disease.** Marine Bolliet, BS; Karen Bovid, MD; Laura Bauler, PhD

36. **Retroperitoneal Schwannoma Complications in a 36-Year-Old Male.** Samuel Lai, MS; Jairo Espinosa, MD; Gitonga Munene, MD

37. **Radiation Induced Angiosarcoma of the Breast in a 74-Year-Old Female.** Samuel Lai, MS; Jairo Espinosa, MD; Gitonga Munene, MD

38. **Acute Colonic Pseudo-Obstruction (Ogilvie Syndrome) Leading to Respiratory Compromise and Death.** John Dewey, BS; Joseph Prahlow, MD

39. **Trends and 30-Day Readmission Rate for Patients Discharged with Diabetes Mellitus with Complication: Analysis of 1,457,583 Admissions.** Jasreen Kaur, MD; Anandbir Bath, MD; Prashant Patel, DO

40. **Drugs that Make Your Skin React – Case of Steven-Johnson Syndrome Associated with Adalimumab Therapy.** Jasreen Kaur, MD; Vishal Deepak, MD; Anandbir Bath, MD; Prashant Patel, DO

41. **Who Ordered the Antiplatelet Therapy?: Analysis of ED Provider Use and Antiplatelet Therapy in the Setting of CVA and TIA.** Philip Pazderka, MD; Michael Williams, MD; John Hoyle, MD; John Aguilar, MD; Ryan Bade, DO; Sean Barkan, MD; Mark Cooper, DO; Benjamin Cramer, MD; Daniel Dietemann, DO; Jason Garner, DO; Jonas Adams, DO; Jordan Bleth, MD; Jessica Zhen, MD

42. **Forgotten but Not Gone: Hyperthyroidism in a Patient with Prior Total Thyroidectomy.** Seth Moffatt, BS; Laura Bauler, PhD; Mark Schauer, MD

43. **A Surprising Case of Adult Intussusception in a Patient with Prior Ileocolic Anastomosis.** Laura Stearns, DO; Joshua Hekmatjah, MS; Michael Chen, MD

44. **Challenges in the Diagnosis of Gallbladder Volvulus.** Vishal Somnay, BS; Joseph Walbridge, BS; Zakiur Rahaman, MD; Saad Shebrain, MD

45. **Spontaneous Retroperitoneal Bleed in an Elderly Patient on Apixaban.** Adil Khan, BS; Joshua Mastenbrook, MD; Laura Bauler, PhD

46. **A Comparative Analysis of Anterior Cruciate Ligament Reconstruction Rehabilitation Protocols in Southwest Michigan.** Donghoon Lee, BS; Tong Li, BS; Keith Kenter, MD

47. **Accidental Hanging: A Case of Autoerotic Asphyxiation Determined After Additional Information from Family.** Jalynn Zou, BS; Theodore Brown, MD; Laura Bauler, PhD

48. **Case Report: A Congenital Neuroblastoma Patient with Brain Metastases.** Minh Nguyen, DO; Carla Schwalm, MD; Nicholas George, MD

49. **Mind-Body Practices Delivered in a Cancer Infusion Suite to Reduce Symptoms and Improve Well-Being: A Practice-Based Study.** Ellen Drosdick, MS; Tina Walter, BA; Harini Pallerla, MS; Sian Cotton, PhD

50. **Spontaneous Peritonitis and Escalating Therapy from Bacterial to Fungal: A Case Report and Review of the Literature.** Eric Sieloff, MD; Richard Roach, MD

51. **Persistent Heart Failure Following Melphalan and Fludarabine Conditioning.** Gisella Newbery, BA; Neiberg de Alcantara Lima, MD; Livia Andrade Gurgel, MD; Ross Driscoll, MD; Carol C V Lima, MD

52. **A Unique Case of Osteomyelitis Caused by Gardnerella Vaginalis and Streptococcus Parasanguinis in a Post-Menopausal Woman.** Jin-Ju Kim, BS; Ricardo de Castro, MD; Mark Schauer, MD; Laura Bauler, PhD

53. **Death Related to Epiglottis.** Joseph Prahlow, MD; Ernest Morton, MS

54. **Morel-Lavallée Lesion: A Closed De-Gloving Injury.** Karthik Ramaseshan, BS; Laura Bauler, PhD; Joshua Mastenbrook, MD

55. **Sunitinib-Induced Pneumatosis Intestinalis in a Patient with Multiple Malignancies.** Mridul Parmar, MD; Michael Reaume, MD; Mark Schauer, MD

56. **Acute Calcific Longus Colli Tendonitis: A Mimicker of Meningitis.** Mridul Parmar, MD; Richard Roach, MD

57. **Quality Improvement in CF Clinic: Patient Downtime and Clinic Workflow.** Carolina Herrera, RN; Myrtha Gregoire-Bottex, MD; Teresa Bailey, PharmD; Sally Bonnema, RD; Rachel Jackson, RN; Nichole Vess, RN; Debra Wells-Schmidt, RN; Julie Hovey, MA; Sheryl Lozowski-Sullivan, PhD; Andrea Caskey, LMSW; Niecia Anjorin, LMSW; Mariam Ischander, MD; Jayne Barr, MD

58. **Arrhythmogenic Right Ventricular Cardiomyopathy in a Young Athlete.** Lucas Rich, BS; Joshua Rarick, MS; Joseph Prahlow, MD

59. **An Intervention Designed to Increase Post-Partum Visit Attendance Rates as a Federally Qualified Health Center.** Mehmiya Raghid, MD; Megan Potilechio, DO; Dalal Kassir, MD; Lauren Vocke, DO; Angela Barreto, MD; Lauren Piper, DO; Jennifer Moubray; Alyssa Woodwyk, MS CAPM

60. **Central Sleep Apnea Thought to be a Results of Strangulation as a Presenting Symptom of MuSK Positive Myasthenia Gravis.** Mehmiya Raghid, MD; Megan Potilechio, DO; Dalal Kassir, MD; Glenn Dregansky, DO

61. **Pseudo-Horseshoe Lung Herniation Following Tracheoesophageal Fistula Repair in a Child with Situs Inversus Totalis.** Rachel Gallimore, BS; Myrtha Gregoire-Bottex, MD; Laura Bauler, PhD

62. **Getting the GIST: An Unusual Presentation of a Gastrointestinal Stromal Tumor.** Tania Torres, MD; Jairo Espinosa, MD; Jesse Chou, BA; Saad Shebrain, MD

63. **A Bundle in the Heart: Wolff-Parkinson-White Syndrome Presenting as Cardiac Arrest.** Anandbir Bath, MD; Stephanie Chang, MS; Eric Sieloff, MD; Jeffrey Wilt, MD

64. **A Case of Methamphetamine Toxicity in a Child with Pica.** Erinn Ton, BS; Christine Stevens, BS; Brandy Shattuck, MD; Prentiss Jones, PhD

65. **Questioning the Validity of Published Data on Percutaneous Transluminal Angioplasty as a Benchmark for Infrainguinal Endovascular Procedures.** Phillip Key, BS; Mekala Neelakantan, BS; Krishna Jain, MD; Mireya Diaz, PhD; Elizabeth Lorbeer, EdM

66. **Crossbow Homicides: More Common Than Reported?** Lo Tamburro, BS; Theodore Brown, MD; Laura Bauler, PhD

67. **Recognizing Lyme Carditis: A Slow Heart Needing Fast Diagnosis.** Samantha Phillips, MD; Rohit Chopra, MD; Steve Pollens, MD

68. **Identification of Risk Factors for Community-Acquired Clostridium Difficile.** Shelbye Herbins, PharmD Candidate; Adam Warner, PharmD

69. **Downstream Medication Dosing Errors Associated with Three Different Methods to Obtain Weights on Prehospital Pediatric Patients.** John Hoyle, MD; Glenn Ekblad, DO; Tracy Hover, BS; Rasha Kazi, MD; Bill Fales, MD; Alyssa Woodwyk, MS CAPM; Richard Brandt, MS

70. **Patients' Opinion Regarding Length of Stay for Cystic Fibrosis (CF) Pulmonary Exacerbations at a Single CF Center.** Sabrina Huq, DO; Andrey Leonov, MD; Richard Brandt, MS; Duncan Vos, MS; Polly Hollenbeck, CRT; Myrtha Gregoire-Bottex, MD

71. **Laparoscopic Repair of Incarcerated Morgagni Hernia.** Drew Moss, BS; Derek Tessman, DO; Saad Shebrain, MD

72. **Characterizing Urologic Dysfunction in Male Patients with Lumbar Disc Disease.** Joshua Hekmatjah, BS; Ernest Agatstein, MD; Mireya Diaz, PhD

73. **Aspiration and ARDS After Repair of a Ketorolac-Induced Ulcer.** Thomas Duong, BS; Michael Chavarria, BS; Thomas George, MD; Joseph Prahlow, MD

74. **Ventriculoperitoneal Shunt Occlusion Resulting in Acute Hydrocephalus and Death in Developmentally-Delayed Patients: 2 Case Reports.** Joshua White, BS; Joseph Prahlow, MD

75. **Death from Pheochromocytoma Initially Suspected of Being a Homicide.** Apoorva Dharmadhikari, BA; Joseph Prahlow, MD

76. **Repair of Giant Inguinal Hernia.** Khadijah Hussain, BS; Cole Kircher, DO; Hira Abidi, MD; Saad Shebrain, MD

77. **Neurologic Acyclovir Toxicity Despite Normal Renal Function.** Jay Patel, BS; Brendan Hayes, MD; Laura Bauler, PhD; Joshua Mastenbrook, MD

78. **Non-ST Elevation Myocardial Infarction or a Missed Diagnosis of Pulmonary Embolism: A Case of Cardiac Arrest Secondary to Acute Pulmonary Embolism in a 52-Year-Old Woman.** Ricardo de Castro, MD; Tooba Tariq, MD; Neiberg Lima, MD; Susan Bannon, MD

79. **Find a Primary Care Physician (PCP)!: Case of a Self-Treating Physician.** Wasif Elahi Shamsi, MD; Thomas Melgar, MD

80. **The Forgotten Disease: An Atypical Case of Lemierre's Syndrome Presenting as a Shoulder Abscess.** Wasif Elahi Shamsi, MD; Kevin Kavanaugh, MD, Prashant Patel, DO

81. **Chylothorax in a Patient with a Peripherally Inserted Central Catheter and Multiple Pro-Thrombotic Risk Factors.** Anna Trinh; Mehdi Farishta, MBBS; Mark Schauer, MD; Laura Bauler, PhD

82. **Does Pancreatic Enzyme Dose Correlate with Improvement of Vitamin D Levels {25(OH)D}, in Cystic Fibrosis (CF) Patients?** Myrtha Gregoire-Bottex, MD; Sally Bonnema, RD; Jasmine Saeedian, BS; Alyssa Woodwyk, MS CAPM; Teresa Bailey, PharmD; Heather Rauch; Polly Hollenbeck, RT; Laura Bauler, PhD

83. **Unusual Suicide Using Two Firearms.** Harrison Seltzer, BS; Brandy Shattuck, MD; Dwayne Wolf, MD PhD; Albert Chu, MD; Joseph Prahlow, MD

84. **Heart Rate Variability and Mild Traumatic Brain Injury: Case Study and Review of Literature.** Harrison Seltzer, BS; Karim Elghawy, MD; Robert Baker, MD PhD

85. **Loperamide Abuse and its Sequelae.** Lauren Strzyzewski, BS; Phillip Key, BS; Prentiss Jones, PhD; Joseph Prahlow, MD

86. **To Treat or Not To Treat: Prednisone Treatment of Minimal Change Disease in a Patient with Chronic HBV.** Trong-Tuong Nguyen, BS; Mark Schauer, MD; Laura Bauler, PhD

87. **Holoprosencephaly.** Natalie Finazzo, BS; Joseph Prahlow, MD; Amanda Fisher-Hubbard, MD

88. **Hypothermia Deaths and Altered Mental Status.** Jasmine Saeedian, BA; Joseph Prahlow, MD

89. **Importance and Approach to Manner of Death Determination in Opioid-Related Deaths.** Michael Abiragi, BA; Laura Bauler, PhD; Theodore Brown, MD

90. **Trapped Behind the Looking Glass: A Case of Hallucinogenic Persisting Perception Disorder with Response to Prazosin.** Alexander Palffy, DO; Alicia Aleardi, MD; Bangalore Ramesh, MD

91. **Using a Spring-Loaded Silo to Facilitate Immediate Bowel Reduction for Sutureless Closure in Gastroschisis.** Daphne Darmawan, MBS; Michael Leinwand, MD

92. **Attention-Deficit/Hyperactivity Disorder (ADHD) and Psychotropic Polypharmacy Trends in Children and Young Adults.** Szymon Litkowiec; Heather Girand, PharmD; Minji Sohn, PhD

93. **Ligature Strangulation Using Cable Ties: 5 Cases.** Nicole Ahmed, BA; Laura Bauler, PhD; Joyce deJong, DO; Theodore Brown, MD; Joseph Prahlow, MD

94. **Non-Bacterial Thrombotic Endocarditis Presenting with Bullae and Blindness.** Alyssa Erskine, DO; Thomas Flynn, MD

95. **An Unusual Presentation of Pyelonephritis in an Adolescent.** Stephanie Witte, MD; Steven Pollens, MD

Poster Presentation Abstracts

MICROGLIAL PROLIFERATION PATTERNS FOLLOWING DAMAGE TO THE OLFACTORY BULB IN ADULT ZEBRAFISH

Susanna Var, BS; Christine Byrd-Jacobs, PhD

Western Michigan University, Biological Sciences

The plasticity of the zebrafish olfactory system is a useful model for examining immune cell response after injury. Microglia are the resident immune cells that respond to damage in the CNS. We previously demonstrated the time course of the microglial response to olfactory bulb (OB) injury in adult zebrafish; however, it is unclear whether the response is from proliferating resident microglia or peripheral migration. We hypothesize that after damage, there will be an increase in resident microglia, followed by the influx of peripheral macrophages, rather than localized cellular proliferation.
A direct lesion to the OB in the whole fish was compared to a direct lesion to the isolated brain in culture removed of all afferent input. 4C4 antibody was used to label microglia, and PCNA antibody was used to label proliferating cells. There were some proliferating microglia in both OBs at most time points after injury, with a notable increase at 12h and 24h after injury in the whole fish. In the isolated brain, there were few to no proliferating microglial profiles in either OBs. Significant increases in activated microglial profiles following 1, 4, and 12h after injury to the isolated brain suggest that microglia can respond to signals without afferent input or peripheral influence, up to a certain time after injury. Our findings suggest that local proliferation may not be a major contributor to the microglial response to OB injury. Further work is required to explore microglial proliferation patterns and their potential role in recovery and regeneration after injury.

MMP1 GENE TRANSFER ENHANCES MYOBLAST MIGRATION AND ENGRAFTMENT IN mdx/SCID MICE

Haiying Pan[1], BS; Kinga Vojnits[2], PhD; Thomas Liu[3], MD; Fanwei Meng[2], PhD; Lei Yang[4], PhD; Yigang Wang[5], MD PhD; Johnny Huard[6], PhD; Charles Cox[7], MD; Yong Li[1], MD PhD

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Myoblast transplantation (MT) is a method to introduce healthy genes into diseased muscles such as Duchenne Muscular Dystrophy (DMD), and have been considered a therapeutic modality in the last decades. However, challenges including cell death and poor engraftment have limited the application. Matrix metalloproteinase type 1 (MMP1), a naturally occurring collagen-digesting enzyme, which specifically digests collagens, types I&III, can eliminate existing fibrotic scarring in different tissues including limb muscles. Our previous studies have discovered MMP1 could improve tissue healing by reversing fibrotic scar tissues and enhancing muscle regeneration in traumatically injured skeletal muscles. We also determined that MMP1 can enhance MT into the dystrophic muscle of mdx mice, a dystrophic skeletal muscle murine model. Our recent study also uncovered the essential benefits of MMP1 in the behaviors of muscle satellite cells and stem cells. Thus, we hypothesize the utilized gene transfer techniques will extend MMP function and improve its efficacy during MT into the diseased dystrophic muscles. A retroviral vector, pLNCX2 (Retroviral Vector, CLONETECH) was selected to encode the full-length human MMP1 gene and was then used to transduce C2C12 myoblasts. Our results indicated MMP1 expression successfully promotes myogenic differentiation/fusion and activates migrations of C2C12 in vitro, as well as improves engraftment of dystrophin-positive myofibers after implantation in vivo. The current study goals to identify a novel technique to apply to improve the delivery of dystrophin gene into the dystrophic muscles, as expecting this technical approach would increase the clinical applicability of MT to the injured and diseased skeletal muscles.

MICRORNA-200c ATTENUATES PERIODONTITIS BY MODULATING PROINFLAMMATORY AND OSTEOCLASTOGENIC MEDIATORS

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This study tested whether miR-200c can attenuate the inflammation and alveolar bone resorption in periodontitis using an in vitro and a rat model. Polyethylenimine (PEI) was used to facilitate the transfection of plasmid DNA encoding miR-200c into primary human gingival fibroblasts (HGFs) and gingival tissues of rats. We first analyzed how proinflammatory and osteoclastogenic mediators in HGFs with overexpression of miR-200c responded to P. gingivalis lipopolysaccharide (LPS-PG) challenge in vitro. We observed that overexpression of miR-200c significantly reduced interleukin (IL)-6 and 8 and repressed interferon-related developmental regulator-1 (IFRD1) in HGFs. miR-200c also down-regulated p65 and p50. In a rat model of periodontitis induced by LPS injection at the gingival sulcus of the 2nd maxillary molar, we analyzed how the mediators in rat gingiva and alveolar bone resorption responded to miR-200c treatment by local injection of PEI-plasmid miR-200c nanoplexes. We observed that the local injection of miR-200c significantly upregulated miR-200c expression in gingiva and reduced IL-6, IL-8, IFRD1, and the ratio of receptor activator of nuclear factor kappa-B ligand / osteoprotegerin ((RANKL / OPG). Using µCT analysis and histomorphometry we further confirmed that local treatment with miR-200c effectively protected alveolar bone resorption in the rat model of periodontitis by reducing the distance between the cemento-enamel junction (CEJ) and the alveolar bone crest (ABC) and the interradicular space in the upper maxilla at 2nd maxillary molar. These findings imply that miR-200c may serve as a unique means to prevent periodontitis and associated bone loss.

CHARACTERIZATION AND BIOCOMPATIBILITY OF A NOVEL BIOINK OF COLLAGEN AND HYDROXYAPATITE

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3D bioprinting is an additive manufacturing process that incorporates viable cells into a three-dimensional matrix. The objectives of this study are to characterize a novel matrix of collagen and hydroxyapatite and to assess the effects of the 3D bioprinting process on cytotoxicity, proliferation rate, and cytokine expression of HEPM (Homo sapiens palatal mesenchyme) cells. We prepared 3D constructs of collagen and hydroxyapatite without and with cells from a novel bioink formulation. We used histology, SEM and TEM to characterize the structure and arrangement of the collagen fibers. We then incubated the 3D constructs with known standards of cytokines to measure adsorption. Finally, we assessed the cytotoxicity of this matrix for HEPM cells and assessed its effect on the production of chemokines and cytokines. A one-way fixed effect ANOVA was fit to concentrations of cytokines and pairwise group comparisons were conducted using Tukey's Honest Significant Differences test ($p<0.05$). The matrix was found to contain strands of collagen and some hydroxyapatite crystals that did not absorb any of the cytokines measured except for MIP-1a ($p< 0.05$). The matrix was found to be non-cytotoxic using an Alamar Blue® assay. In the presence of the hydrogel the HEPM cells had similar expression profiles of the cytokines measured ($P > 0.05$ for GMCSF, IL-6, IL-8, and RANTES). Here we show that a novel matrix of collagen and hydroxyapatite is non-cytotoxic to HEPM cells and the 3D bioprinting process does not induce a proinflammatory response.

ATTENUATED ASTROGLIOSIS IN THE OLFACTORY BULB OF ADULT ZEBRAFISH AFTER REPEATED PERIPHERAL DAMAGE

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Traumatic brain injuries (TBIs), particularly if repetitive, causes massive disruptions in brain structure and function. The brain requires a degree of neuroplasticity to rewire and repair damaged neurons, and glia are crucial mediators of this process. When the brain is damaged, astrocytes, a type of glia, undergo astrogliosis characterized by hypertrophy and proliferation. Humans have evolved to have a limited degree of neuroplasticity, which inhibits the ability to recover from TBIs. Zebrafish, however, are renowned for their neuroplasticity, and their olfactory system is an excellent model for this. Therefore, we use the adult zebrafish olfactory system to explore neuroplasticity in response to repeated mechanical damage.

In our study we inserted a wax plug into the nasal cavity to damage the olfactory organ repeatedly over one week. This resulted in a decrease in sensory neurons projecting into the olfactory bulb. Our hypothesis was that mechanical damage to the olfactory organ will cause astrogliosis in the olfactory bulb. We found that in the olfactory bulb astrocyte processes that were associated with glomeruli hypertrophy after one day. However, astrocyte processes appeared to return to typical morphology at later time points. Since zebrafish astrocytes did not remain hypertrophied they likely returned to their typical function. This is in contrast to what would be expected of mammalian astrocytes, which would remain hypertrophied in the presence of persisting damaging stimuli. Exploring these glial cells in non-mammalian systems like the zebrafish may lead to novel medical treatments.

THE INJURY INDUCED POPULATION OF MUSCLE-DERIVED STEM CELL-LIKE CELLS

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Tissue repair after injury is a complex biological process, which involves the activation of tissue-resident precursors or/and stem cells, and a variety of infiltrating cells responding to local and systemic signals. Mammalian skeletal muscle regeneration relies on the activation and proliferation of the resident muscle precursor cells including satellite cells and muscle stem cells (MuSCs), which are populations of mononucleated cells located between the basal lamina and sarcolemma of muscle fibers. Those MuSCs are able to devise and differentiate to response the tissue regeneration and repair. However, the behaviors of MuSCs and their regulations within the injured environment have not been well studied. We recently discovered a novel population of stem cells from the injured murine muscles. These injury induced muscle-derived stem cell-like cells (iMuSCs) are partially reprogrammed from differentiated myogenic cells and display a pluripotent-like state. The iMuSCs exhibit stem cell properties including the ability to differentiate into multiple lineages, such as neurogenic and myogenic differentiation; they also display a superior migration capacity that demonstrating a strong ability of muscle engraftment in vivo. IMuSCs express several pluripotent and myogenic stem cell markers; have the capability to form embryoid bodies and teratomas, and can differentiate into all three germ layers. Moreover, blastocyst microinjection showed that the iMuSCs contributed to chimeric embryos but could not complete germline transmission. Our results indicate that the iMuSCs are in a partially reprogrammed state of pluripotency, which is generated by the microenvironment of injured skeletal muscle.

THE HOMEODOMAIN PROTEIN CUX1 IS REGULATED BY THE NOTCH SIGNALING PATHWAY IN THE DEVELOPING KIDNEY

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Notch signaling is a highly conserved cell-cell communication pathway that is important for the development of most organisms. Cux1 is the murine homologue of the Drosophila gene Cut. In Drosophila, multiple genetic interactions between Cut and the Notch and Wingless signaling pathways occur during development. Cux1 is upregulated in rat kidney epithelial cells expressing a constitutively active Notch1 (Notch1ic), and interacts with the groucho homologue Grg4 to regulate p27 expression in the developing kidney. Moreover, Cux1 co-localizes with several components of the Notch signaling pathway during kidney development. To further evaluate whether Cux1 is an effector of the Notch signaling pathway we used the gamma-secretase inhibitor DAPT to block all Notch signaling in kidney organ cultures. DAPT treatment significantly inhibited growth of wild-type metanephroi. In contrast, Cux1 transgenic kidney cultures treated with DAPT were not growth inhibited, but showed high levels of cell proliferation in the nephrogenic zone, and ureteric bud branching was similar to vehicle treated kidney cultures. Notch1ic cells showed an increase in cell proliferation compared to wild type RKE cells, however, antisense knockdown of Cux1 in the Notch1ic cells reduced cell proliferation to the same level as wild type cells. Finally, the targeted deletion of RBPJ/k, a transcription factor required for canonical Notch signaling, in the developing ureteric bud and collecting duct, resulted in the complete absence of Cux1 protein specifically in the ureteric bud and collecting duct cells. Taken together, these results suggest that Notch signaling regulates the expression of Cux1 in the developing kidney.

REPROGRAMMING MYOBLASTS INTO POTENT STEM CELLS THROUGH INJURY MUSCLE TISSUE EXTRACTS

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We recently discovered the potency of muscle stem cells isolated from injured and non-injured muscle differ significantly. The current report hypothesizes that the 'micro-milieu' vs. the niche within the injured muscles can regulate the resident muscle cells into a potency behavior of adult stem cells. We thus propose to investigate whether supplementing the cells' culture medium with injured muscle tissue extract (IMTE) can influence the potency and regenerative potential of myoblasts in vitro. Treatment of IMTEs resulted in the myoblasts increase proliferation, differentiation and migration abilities as well as increased their survival abilities within the stress, e.g. oxidative culture conditions in vitro. We also detected the IMTEs treated myoblasts increased miRNA133 but decreased miRNA miRNA206 and P38. Our study provides proof for the concept that the injured tissues micro-milieu contain some stimulator that can enhance the stem cell potency, prevent resident cell survival and accelerate the regenerative potential for the injured tissues. This study also suggests the modification of stem cell behaviors with the injured tissues that will be another important outcome to provide novel insight into the field of stem cell-based regenerative medicine and applications.

POINT-OF-CARE ULTRASOUND IN THE AMAZON JUNGLE: A CASE SERIES

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Point-of-care ultrasound (POCUS) is a portable and cost-effective tool that can be invaluable in resource-limited settings. We present a case series of three patients in whom POCUS was used as a key to diagnosis, and thus to facilitate treatment. Over a 2-week period, a group of physicians provided direct patient care in multiple remote villages in the Amazon jungle of Peru. This "mobile" clinic served over 1400 patients who would otherwise have to travel several hours by boat to seek health care. We present a case series of three patients in whom POCUS was used as a key to diagnosis, and thus to facilitate treatment. Utilizing POCUS in remote, resource-limited areas can help to facilitate definitive diagnosis and management. POCUS can also be used for therapeutic interventions, assisting in safety and accuracy of procedures that includes incision/drainage of abscesses or joint injections. POCUS was particularly useful in generating appropriate referrals, reducing the time to definitive treatment for the patient. Ensuring that an accurate diagnosis was made with ultrasound provided confidence that the resources of the patient and the healthcare system were being utilized appropriately. Our team intends to pursue further research into the effects of POCUS on clinical decision making in the Amazon jungle.

DIFFERENTIAL SURVIVAL: DO RACIAL AND SOCIOECONOMIC DISPARITIES PERSIST BEYOND "POOR BIRTH OUTCOMES"?

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BACKGROUND: In Kalamazoo County, significant racial and socioeconomic disparities are evident in infant mortality rates. The greater prevalence of poor birth outcomes (PBO) (prematurity, low birthweight, small for gestational age) among infants of color and poor infants is a significant contributor. It is unknown, however, whether these disparities continue to impact the survival of PBO infants.

OBJECTIVE: To examine whether there are racial or socioeconomic differences in the one-year-survival of PBO infants, controlling for other health contributors.

METHODS: This was a secondary analysis study utilizing county birth and death records from 2008-2015 of 21,633 deliveries. Generalized estimating equation was used to assess predictive relationship between demographics and mortality outcomes, accounting for repeated mother births.

RESULTS: Overall, 4528/21,633 deliveries (20.9%) resulted in a PBO. Substantial racial and socioeconomic disparities were seen in the PBO prevalence: 30.3% for infants of color versus 17.9% of white infants ($p<.001$), and 25.6% for Medicaid infants versus 16.5% for privately-insured infants ($p<.001$). Among PBO infants, death is a relatively rare event: 115 of 4528 (2.5%) died before their first birthday. Neither race nor socioeconomic status was a significant predictor of infant: race aOR 0.95, CI 0.59 & 1.52, and socioeconomic aOR 0.99, CI 0.524 & 1.88. Factors that were significantly associated with mortality included prenatal care level, history of poor birth outcomes, maternal chronic disease condition, and maternal prenatal weight gain.

CONCLUSION: Although racial and socioeconomic disparities are present in the likelihood of a poor birth outcome, these disparities do not persist beyond that.

NEIGHBORHOOD SOCIAL-DETERMINANTS-OF-HEALTH RISK AND ACCESS TO PEDIATRIC CARE

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Neighborhood characteristics affect the health of resident children. Children in neighborhoods with high social-determinants-of-health risk (SDOH-risk) are more likely to need treatment for health conditions, increasing the importance of access to primary care providers (PCP). PCP access is affected by patient insurance status and ability to travel to the provider. Using the Institute-for-Health-Improvement's Population Health Model, the study goal was to examine whether neighborhood SDOH-risk was related to accessibility of healthcare.

METHODS: This was a secondary analysis integrating census data, primary care practice information and individual-level demographic and health data. Sample was 57 census tracts (CT) in Kalamazoo County. SDOH-risk was calculated using neighborhood factors differentiating CTs into high and low prematurity-rate quintiles. Accessibility was operationalized as geographically accessible (travel time), and insurance access (practice Medicaid acceptance). Geospatial analysis used ArcGIS and multivariable regression used SPSS with two-sided significance, alpha at .05.

RESULTS: SDOH-risk varies widely, with CT SDOH-risks ranging 0-6. Between the lowest and highest CTs, prematurity rates varied 23%. There are 31 primary care practices that serve children in Kalamazoo County; 9 have new-Medicaid-patient accepting practices.

Neighborhood SDOH-risk is unrelated to practice location in the CT (OR 1.054, CI 0.753 & 1.477, p=.757). There is no significant relationship between SDOH-risk and Medicaid acceptance (OR 1.254, CI 0.710 & 2.214, p=.435). SDOH-risk is unrelated to mean travel time, even after adjusting for insurance access (unstandardized beta -0.461, CI -1.280 & 0.358, p=.252).

CONCLUSION: Pediatric systems of care in Kalamazoo County do not appear to be geographically aligned with SDOH-risk.

THE EPIC PROCEDURE FOR PILONIDAL DISEASE - ENDOSCOPIC-ASSISTED PILONIDAL IRRIGATION AND CLEANING

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BACKGROUND: Pilonidal disease is a common condition of the sacrococcygeal region caused by invagination of hair follicles leading to inflammation and abscess formation. Many surgical options have been employed for its management; minimally-invasive techniques have more recently been investigated. Our technique, the "EPIC procedure:" Endoscopic-assisted Pilonidal Irrigation and Cleaning, involves removal of trapped hair with the aid of an endoscope while flushing with saline. We aim to show that the EPIC procedure is a safe and effective operation for the treatment of pilonidal disease in the pediatric population.

METHODS: This study is a retrospective chart review including 10 consecutive patients who presented to a single pediatric surgeon at a single institution from December, 2016 to September, 2018. We evaluated gender, age, weight, disease severity, operative duration, recurrence of pilonidal disease, and other complications.

RESULTS: Ten patients were included in the study; 11 EPIC procedures were completed. The median follow up duration was 1.6 (range 0.2-15.9) months. The median operative duration was 27 (13-60) minutes. The rate of recurrence of pilonidal cyst in our sample was 10% (95% CI: 0.25%, 44.5%). One patient developed a fungal-appearing infection. There were no other complications.

DISCUSSION: There is currently no standard procedure for the treatment of pilonidal disease. Our study had a single recurrence in a patient who did not follow postoperative bathing and hair removal instructions. He underwent repeat EPIC procedure and had no further recurrence. The EPIC procedure is a minimally invasive technique that is easy, fast, and effective.

UNUSUAL PRESENTATION OF CONCOMITANT APPENDICITIS AND MECKEL'S DIVERTICULITIS FROM MECKEL'S NEUROENDOCRINE TUMOR.

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Appendicitis and Meckel's diverticulitis (MD) are common conditions that rarely present simultaneously. To the best of our knowledge and literature review; this is the second case report of co-presenting appendicitis and MD, and the first of this combination presenting with a neuroendocrine tumor. The standard treatment for uncomplicated acute appendicitis is appendectomy; non-surgical management is an area of ongoing investigation. MD can present similar to acute appendicitis. Small bowel resection is the standard treatment of MD. Non-operative management versus surgical resection is a debatable topic for incidentally found Meckel's diverticulum. Malignancies develop in approximately 5% of Meckel's diverticula with neuroendocrine tumors accounting for 76.5%. We present a patient that was treated surgically for appendicitis and MD, with a neuroendocrine tumor contained within the resected diverticulum.

CASE HISTORY: A 50 year-old man presented with acute lower abdominal pain. CT demonstrated inflammation of the small bowel with a possible blind-ended pouch and minimal free air. Patient underwent an appendectomy and a small bowel resection for appendicitis and MD. Pathology of the resected bowel displayed inflamed and necrotic Meckel diverticulum containing a well-differentiated neuroendocrine tumor.

DISCUSSION: Meckel's diverticula are the most common congenital abnormality of the gastrointestinal tract, presenting in about 2% of the population. They are commonly asymptomatic, but about 4% present with complications. Based on the findings of our case report, we believe that strong consideration should be given to perform small bowel resection of incidentally found Meckel's diverticula as these anomalies may contain malignancies within them.

TRENDS IN OPIOID-RELATED DEATHS IN KALAMAZOO COUNTY, MICHIGAN

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BACKGROUND: Over the past five years, the United States has seen a significant increase in drug overdose deaths, with over half involving an opioid. Opioid-related deaths in Kalamazoo County, Michigan were responsible for more than three-quarters of total drug-related deaths in 2015, 2016, and 2017.

OBJECTIVE: To better understand opioid-related deaths in Kalamazoo County, a one-year review of opioid-related deaths (September 2017 through August 2018) was performed to assess drug associations between opioid and non-opioid drugs, reported past drug use history, age, sex, and race.

MATERIALS AND METHODS: The medical examiner's database was queried for drug-related deaths that included at least one opioid in Kalamazoo County. Fifty-five cases were identified and examined through data obtained by the Western Michigan University Homer Stryker M.D. School of Medicine Swift Toxicology for Opioid-Related Mortalities project.

RESULTS AND DISCUSSION: Common drug associations included cocaine with fentanyl and morphine, ethanol with fentanyl, heroin with codeine, and 6-acetylmorphine with fentanyl. 87% had reported drug use based on medical examiner investigation. The average age at death was 39.4 years. 71% of individuals were male and 29% female, and 89% were white while 11% were African American.

THE INFLUENCE OF HOMELESSNESS ON GOAL SETTING AMONG PARTICIPANTS OF KALAMAZOO'S FATHERHOOD CASE MANAGEMENT PROGRAM

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BACKGROUND: The Kalamazoo's Fatherhood Case Management Program engages fathers from high-risk perinatal families via group discussions, support, and goal setting. Using Maslow's hierarchy of needs the goals of participants were analyzed. Housing security was considered an indicator for having the most basic level of need.

PURPOSE: Use Maslow's Hierarchy to examine the effect of homelessness on goal setting trends, particularly related to establishing health goals among Fatherhood Case Management Program participants.

METHODS: Forty-nine men in the Fatherhood Case Management Program were enrolled from May 2017 to May 2018. Twenty-one participants identified goals through the program. Their goals fell into five categories: Housing, Health, Financial, Socialization and Education. Housing security was dichotomized into homeless or not. Pearson Chi Square was conducted to examine the relationship of housing status and goal setting.

RESULTS AND DISCUSSION: The 21 participants were split between homeless (8, 38.1%) and not (13, 61.9%). Thirty-eight goals were recorded for 21 of the 49 participants. Financial and Educational goals were most frequently reported (48%), followed by Housing (43%), Health (29%) and, finally Socialization (5%). A statistically significant difference in housing goals was observed, with homeless participants prioritizing the basic need for housing over other goals, including health goals (p=0.042).

CONCLUSION: Housing goals were more frequently reported by homeless participants. For clinicians, it is important to recognize patients living in disadvantaged circumstances have other, more pressing, goals that compete with healthcare priorities.

A QUALITY IMPROVEMENT INITIATIVE TO REMODEL MEDICATION REFILL PROCESSES IN A PEDIATRIC CYSTIC FIBROSIS CLINIC

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BACKGROUND: For CF patients, poor medication adherence contributes to health exacerbations and hospitalization. Both patient and healthcare provider factors impact medication adherence. According to a January 2018 survey, our patients reported receiving timely refills 57% of the time.

PURPOSE: A quality improvement study assessed the healthcare provider factors that may contribute to the slowness of refill requests.

MATERIALS AND METHODS: Using fishbone modeling and flowcharts, current medication refill processes were documented. Fishbone modeling identified the people, environments, and equipment/materials involved in the process. Flowcharts documented the refill processes when received via telephone and at appointment. Surveys were completed by the CF team regarding time spent refilling medications, level of work stress and morale/attitude.

RESULTS: Multiple team members were involved in the processing of medication refill requests. Our 0.33 FTE nurse spends 3.3 hours of designated 13.2 CF work hours addressing refill requests. Other providers spend approximately 30 minutes per week addressing refills. Our team believes our inefficiency contributes to our work stress and morale/attitude. Seventy-five percent of our team stated work as "very stressful" or "somewhat stressful". More than 80% of our team identified work morale/attitude as "fair" or "poor".

DISCUSSION: Due to inefficiencies of our refill process, multiple individuals were involved during a single refill request. Additionally each individual was not consistently available due to scheduling to track an individual request over time. A standardized protocol will be implemented with one team member addressing all requests. Pharmacies will be called to verify refill needs.

ADDITION OF PHARMACIST IN A PEDIATRIC CYSTIC FIBROSIS CLINIC

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BACKGROUND: Poor medication adherence is a common problem for patients with Cystic Fibrosis, and leads to poor health outcomes. Medication adherence is impacted by patient, healthcare provider and treatment related factors.

OBJECTIVE: To increase the percentage of patients receiving appropriate CF medications by introducing a pharmacist to the CF team.

MATERIALS AND METHODS: In 2015, a pharmacist was incorporated into the CF Clinic to increase: medication knowledge, accuracy of the medication record, evaluation of drug therapies for efficacy and toxicity, and medication adherence. The percentage of patients receiving each CF medication, pulmonary function tests and exacerbations were collected annually. Data were compared from 2014-2017 to evaluate the impact of the intervention.

RESULTS: Greater than 90% of our patients received hypertonic saline in 2017, compared to 50% in 2014. Greater than 85% of our patients with approved mutations received CFTR modulators in 2017 compared to 25% in 2014. The percent of patients receiving azithromycin decreased from 100% in 2014 to 80% in 2017. Median FEV1 and median FVC percent predicted for patients increased in 2017. Percent of patients with one or more pulmonary exacerbations increased from 2014 to 2017.

CONCLUSION: Overall the percentage of patients receiving appropriate CF medications increased, in part by the addition of a pharmacist. However, additional barriers continue to hinder patient adherence to CF medications, further quality improvement interventions are needed to further improve patient medication adherence. Patient knowledge and EMR accuracy will be assessed in the future.

GENERATION OF A SOCIOECONOMIC STATUS CLASSIFIER FROM KALAMAZOO COUNTY POSTPARTUM SURVEY RESPONSES

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BACKGROUND: In Kalamazoo County, the death rate among black infants is 3.2 times that of white infants. Medical records review and phone surveys were conducted for Kalamazoo County women recruited from postpartum floors of the two delivery hospitals. Data were collected for prenatal, delivery, postpartum care, and material-social health determinants. Numerous items measured various aspects of SES.

GOAL: The goal of this analysis was to condense this rich set of SES information into a lesser number of dimensions with minimal information loss.

METHODS: Multiple Correspondence Analysis (MCA) followed by scree plots for randomly generated copies of SES responses were used to determine the data dimensionality. Ward cluster analysis was then performed on the MCA-generated dimensions, and frequency distributions for the clusters were obtained across demographics to describe them.

Results: Scree plots of the MCA output identified three dimensions describing SES. Ward cluster analysis recognized three distinct groups. Upon further quantitative analysis and community stakeholder feedback, it was determined that these three clusters represented meaningful SES grouping:

1. 44.7% (109) "Enough" - Adequate SES resources
2. 47.1% (115) "On the edge" - Low to medium income with safety net support
3. 7.8% (19) "Deep poverty" - Very low income and little support

DISCUSSION: Utilizing MCA with Ward cluster analysis provided a useful tool to generate a single and meaningful classification element. Further analysis elucidated distinct SES classes of Kalamazoo County mothers, creating an encompassing metric useful for analysis and interpretation of pertinent data.

A STITCH IN TIME SAVES NINE: UNTREATED PERINATAL DEPRESSION HURTS FUTURE GENERATIONS

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BACKGROUND: The perinatal period encompasses the first, second and third trimesters of pregnancy and the first postpartum year. Women are inherently at higher risk of depression, the profound physiological and emotional changes of pregnancy and postpartum period further increases the risk of perinatal depression (PD). While genetic predisposition, previous history of depression, age and parity are important risk factors, a range of socioeconomic factors was found to significantly contribute to developing PD.

CONSEQUENCES OF UNTREATED PERINATAL DEPRESSION: Untreated PD has profound negative consequences for the mother including a significant risk of suicide. PD is can also cause cognitive, behavioral, and emotional problems along with insecure attachment for the baby. Mothers with PD were likely to describe their children having behavior problems at age 5. At 10 years the offspring of depressed parents were more likely then control group to develop social impairment, depression, anxiety and alcohol dependence. At 20 years, the same sample was found to have developed cardiovascular and other physical health problems at a higher rate. Furthermore, poor maternal mental health is predictive of reduced academic achievement in the offspring. Since academic achievement is a core measure of human capital and the prosperity of nations rests on human capital, untreated perinatal depression adversely impacts this prospect.

CONCLUSION: The impact of PD is trans-generational with broad societal impact. Universal mental health screening of women during pregnancy and in the first postpartum year should be routine policy to provide early and optimal care for women suffering with perinatal depression.

MALIGNANT VASOVAGAL SYNCOPE PRESENTING WITH SEIZURE-LIKE ACTIVITY

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CASE: The patient is a 34 year old woman with a 20 year history of suspected seizures. Episodes included loss of consciousness with incontinence, preceded by nausea, headache, staring spells, and abnormal vocalization. Episodes were followed by confusion and fatigue. No epileptic activity seen on previous EEGs. She was placed on outpatient cardiac monitoring to evaluate for alternative causes.

Cardiac monitoring showed prolonged periods of asystole, lasting up to 21 seconds. These cardiac events correlated with her seizure-like episodes. Due to the severity of her asystolic periods, a single-chamber cardiac pacer was placed. Patient was diagnosed with malignant vasovagal syncope.

DISCUSSION: Malignant vasovagal syncope is defined as recurrent and severe syncope in which a neural reflex causes severe bradycardia, with eventual asystole. There are very few cases reported of syncope with prolonged asystole.

It is important to rule out cardiac arrhythmia, structural disease, and non-cardiac causes when working up syncopal episodes. A head-up tilt-table test can be done while patient is on a cardiac monitor to induce the neuro-reflex. For infrequent syncopal episodes, long term cardiac monitoring can be used.

It is a Class 1, Level C recommendation to place a permanent pacemaker if there is syncope with periods of asystole greater than 3 seconds. Most randomized, placebo-controlled clinical studies to date show no difference between medical management for vasovagal syncope and placebo groups.

CONCLUSION: Although potentially fatal causes of syncope are rare, prompt diagnosis and treatment is critical to prevent serious complication.

A PALPABLE PULSATILE RADIAL ARTERIAL LINE INSERTION SIMULATOR

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Cannulation of the radial artery is a key procedure required for intensive care blood pressure monitoring. Medical students, residents, and critical care fellows alike often have exposure to this procedure during their intensive care rotations. Various methods exist regarding radial artery cannulation including ultrasound-guided and manual palpation-guided needle insertion. Unfortunately, simulation models for radial artery cannulation are somewhat lacking in regards to palpable pulsatile radial artery cannulation. Often, in order to have a robust palpable and durable model, the radial artery vessel itself is out of proportion to the typical human radial artery. Furthermore, educational simulators often lack arterial pressure simulation which is an important physiological indicator during radial artery cannulation. We describe the development of a palpable, pulsatile radial arterial line simulator at Western Michigan University Homer Stryker M.D. School of Medicine that is representative to vessel size and arterial pressure.

CLINICAL CLUES TO CREUTZFELDT-JAKOB DISEASE

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INTRODUCTION: Creutzfeldt-Jakob Disease is difficult to diagnose. Currently, the gold standard is autopsy confirmation, making it a diagnosis of exclusion during life. But there are signs and tests that can be used to clue us to the disease. Here, we outline steps taken to rule in diagnosis in a case with complex symptoms.

CASE PRESENTATION: A 59 year old Caucasian female with history of recent and remote TBIs presented with altered mental status. Family reported progressive functional decline following both TBIs, with a more dramatic decline during the 2 days prior to admission. Symptoms included mood lability, aggression, memory loss and psychotic symptoms.
Hospital workup included urinalysis, UDS, blood tests, imaging, and extensive CSF analysis. Although most labs were unremarkable, some inflammatory markers were mildly elevated. Non-specific physical findings included intermittent mild startle response and jerking movement of extremities. A variety of psychotropic medications were used for behavioral dysregulation. Once behaviorally stable, she was discharged to nursing home because of prominent cognitive decline. CSF findings did return weeks later positive for 14-3-3 protein.

DISCUSSION: Although CJD cannot be definitively diagnosed during life, specific labs, physical signs and symptoms and clinical suspicion may be suggestive. Here, CSF protein such as 14-3-3, S100B, and Tau protein strongly point to prion disease. Fatigue, disordered sleep, and decreased appetite, progressing into memory loss, confusion, hyperekplexia and uncharacteristic behaviors are early signs. Muscle jerks, rapid dementia progression, and ataxia come later. Pulvinar Sign on MRI and CSF RT-QuIC are also highly specific. Treatment is supportive.

LEVOTHYROXINE ASSOCIATED SUICIDAL OVERDOSE

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INTRODUCTION: Mental illness is common in the US, with 18.2% of adults diagnosed with a mental disorder in 2016[1]. Those with mental illnesses have an increased risk of suicide, with poisonings accounting for 14.8% of suicides in 2016[2].

PURPOSE: We present a case of fatal levothyroxine and quetiapine overdose in a bipolar patient.

RESULTS: A 68-year-old bipolar woman with a history of suicidal ideation and previous overdose attempts was found dead. Several empty prescription pill bottles were discovered. At autopsy, previous total surgical resection of the thyroid and coronary artery atherosclerosis were noted. Toxicology testing revealed postmortem blood levels of quetiapine at 3877 ng/mL (NL - 100-1000)[3], free T3 at 32.55 pg/mL (NL - 2.57-4.43), and free T4 at 3.9 ng/dL (NL - 0.9-1.7). The cause of death was suicidal overdose via levothyroxine and quetiapine consumption.

DISCUSSION: Levothyroxine is a synthetic form of T4 that is converted to T3 in most cells and is used to treat hypothyroidism. These thyroid hormones are known to stimulate adrenergic receptors and subsequently increase cardiac output. In very high levels, they can stimulate arrhythmias and severe hypoglycemia[4]. Quetiapine is an antipsychotic drug that acts as an adrenergic receptor antagonist, inducing severe hypotension and tachycardia in overdose[3]. Although quetiapine is not infrequently present in suicidal overdoses[5], the presence of levothyroxine is much less common. This may be related to the fact that levothyroxine is not routinely screened for in toxicology tests.

CONCLUSION: A diagnosis of levothyroxine overdose is possible, but it requires special testing.

PROSOCIAL BEHAVIOR OF MEDICAL STUDENTS: AN EXPERIMENT USING THE TRUST GAME

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OBJECTIVE: Very little research has been conducted on the pro-social behavior of medical students. But given that medical students must be prepared to function in a fiduciary relationship-a relationship in which one party puts the interests of the other party ahead of their own-pro-social behaviors such as trust and altruism are critical to the therapeutic alliance. Thus, we sought to investigate the pro-social behavior of medical students.

METHODS: To observe medical students' pro-social behavior, we used the trust game. Subjects are endowed with a fund, which they must invest with another player. That investment is tripled and given to the other player. The other player must then return some percentage of that fund to the investor. The values selected are supposed to be measures of pro-social behavior. We compare the medical students' behavior with that of law students in the same game.

RESULTS: Medical students, on average exhibited slightly higher trusting behavior, measured by the amount they chose to invest, than exhibited in the literature average. They exhibited levels of altruism similar to that of the literature average. However, while the averages were similar to the literature average, the distribution of pro-social behavior was not normal-approximately half the medical students were strongly trusting and altruistic and the other half was weakly trusting and altruistic.

CONCLUSION: Medical students, overall, may be very similar to the literature average, they display divergent pro-social behavior. Curriculum and remediation in professionalism should therefore accommodate these patterns.

CREATING A POINT OF CARE ULTRASOUND COURSE FOR MEDICAL RESIDENTS: A MODEL FOR CURRICULUM DEVELOPMENT

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BACKGROUND: Point Of Care Ultrasound (POCUS) is a promising new modality that has many potential applications for clinical medicine. Due to its low cost, broad application, and relative portability POCUS is a useful tool for interests across primary care, hospital based medicine, and specialists. Unfortunately POCUS training for internal medicine residents is largely lacking. Currently in its 5th year, Western Michigan University (WMU) offers primary care POCUS training course to all interested internal medicine residents. Creation of this course however faced many unique barriers. We present a model for incorporating POCUS training into internal medicine training with a specific focus on barriers and applications.

METHODS: The first step in creation of a POCUS course was faculty development. In the years prior to the creation of the POCUS course two WMU faculty participated in week long intensive POCUS courses as part of continuing medical education. Additional guest lecturers were recruited to assist the core faculty in training for their various topics. A flipped classroom model with at home instructional videos and 10 hands on sessions for residents to practice on one another was utilized. Residents who subsequently passed the final exam were invited to participate as POCUS instructors for subsequent years.

CONCLUSION: Creation of an internal medicine residency based POCUS course has many barriers. Specifically initial faculty development and institutional support are major but surmountable barriers. Once a critical mass of dedicated POCUS learners and teachers is reached however, POCUS training can be effectively incorporated into internal medicine residency training.

CAREGIVER AWARENESS OF GENETIC TESTING FOR AUTISM SPECTRUM DISORDER

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Genetic etiology testing for Autism Spectrum Disorder (ASD) has been widely recommended by several professional societies for more than a decade. Recent data reveals that these services are severely underutilized, but the reasons for this are not well established. We developed an online survey to explore this deficit by evaluating the rate that caregivers are aware of, offered, and have completed genetic testing for their child with ASD. The survey was disseminated through the Chicago, IL and Milwaukee, WI chapters of Autism Speaks, a national caregiver support group for ASD. 138 caregivers completed the survey, with only 53.6% being aware of genetic testing for ASD. Furthermore, only 30% were offered genetic testing by their provider and merely 17.4% actually completed genetic testing for their child, despite the fact that most would participate in genetic testing if it was available. Insurance denials also prevented some caregivers from completing genetic testing. Overall, this survey reveals barriers to genetic testing for ASD at several levels, beginning largely with a lack of awareness by the caregiver but also involving issues with ASD management and insurance coverage. Recognition of these barriers can inform the development of targeted social and educational programs. In doing so, we may be able to significantly increase the utilization rate of genetic testing in ASD.

PATIENT MISUNDERSTANDING OF FINDINGS LEADS TO SUICIDE

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INTRODUCTION: Our words as physicians carry great weight. Occasionally, we can become numb to the sway we have on the lives of our patients. Patient misinterpretation of our words can have devastating consequences.

PURPOSE: The purpose of this presentation is to highlight a case where a patient's misunderstanding of information provided resulted in her tragic suicide.

MATERIALS: The case is from the files of one of the authors (JP).

RESULTS: A 75-year-old woman with a history of chronic obstructive pulmonary disease, atrial fibrillation, and hypertension presented to an Emergency Department with complaints of worsening constipation, epigastric pain, and nausea of 3-days' duration. Physical exam was nonspecific. A computed tomography scan revealed bilateral cystic and solid adnexal masses concerning for ovarian neoplasms. She was referred to an oncologist. Two days later, before seeing the oncologist, she was found dead in her bed, with a suicide note present. Subsequent medicolegal autopsy revealed that she died from a suicidal overdose of multiple medications, but that the bilateral ovarian tumors were, in fact, benign cystic adenofibromas.

DISCUSSION: The patient wrongly assumed that the referral to an oncologist and mention of tumors meant that she had cancer. This discrepancy of understanding had dire consequences. Had her care providers understood her misinterpretation of the findings in this case, her tragic death might have been avoided.

CONCLUSION: The case serves to remind physicians and all healthcare professionals as to the importance of establishing a mutual understanding with patients.

CONCURRENT OSTEOCHONDROMA AND SYNOVIAL CHONDROMATOSIS OF THE HIP IN THE ABSENCE OF MULTIPLE HEREDITARY EXOSTOSIS: A CASE REPORT

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Osteochondromas and synovial chondromatosis are uncommon conditions, independently. The occurrence of either of these in conditions within the hip joint is rarer still. Thus, the development of simultaneous osteochondroma and synovial chondromatosis of the hip remains virtually unreported in prior literature. We herein report a very rare case of concomitant osteochondroma and synovial chondromatosis of the hip in a 22-year-old male in the absence of Multiple Hereditary Exostosis (MHE).

The patient is a 22-year-old male who presented with two years of worsening, atraumatic, insidious onset left hip pain. Mechanical symptoms of catching and locking were present and affecting the patient's quality of life. Physical exam of the hip demonstrated a global decrease in motion. Plain films and advanced imaging consisting of CT and MRI were performed which delineated the diagnosis of intra-articular osteochondroma and concurrent synovial chondromatosis. Definitive treatment consisted of surgical hip dislocation with excision of concomitant pathologies and prophylactic fixation of the femoral neck.

The patient tolerated the procedure well and was recently seen in outpatient clinic approximately 16.5 months out from his procedure. To date, the patient continues to have full range of motion of the hip joint, with no signs of antalgic gait, recurrence, or femoral head avascular necrosis.

SACCULAR ANEURYSM RUPTURE WITH SIMULTANEOUS, NON-CONTRIBUTORY HEROIN USE

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INTRODUCTION: Heroin can cause fatal cardiovascular problems such as non-cardiogenic pulmonary edema, arrhythmia and depressed ventilation. While postmortem detection of drugs can be confirmed by external examination and drug testing alone, full autopsy examination is preferred to elicit the most accurate cause of death.

CASE HISTORY: A 23-year-old male with a history of hypertension and heroin use collapsed and had difficulty breathing. Despite cardiopulmonary resuscitation, he was pronounced dead at scene. No evidence of drugs or paraphernalia were found. Full postmortem autopsy examination was significant for extensive acute subarachnoid hemorrhage and absence of traumatic head injury. Hemorrhage location and acute blood obscuring the Circle of Willis suggested probable ruptured saccular aneurysm. Toxicology studies were most significant for morphine in the femoral blood and 6-monacetylmorphine, morphine, and codeine in urine, which indicated heroin use. While the decedent used heroin prior to death, circumstances and autopsy findings were consistent with non-traumatic subarachnoid hemorrhage due to probable ruptured saccular aneurysm, not heroin toxicity.

DISCUSSION: This case highlights the importance of concordant evaluation of circumstances of death, scene investigation, and full autopsy examination in suspected drug overdoses. Postmortem toxicology alone may have incorrectly indicated accidental death due to heroin toxicity. While heroin can cause severe cardiovascular events, it is not thought to exacerbate preexisting hypertension and associated aneurysms. Equal emphasis on circumstances of death, scene investigation, and full autopsy examination determined this case to be a natural death from non-traumatic acute subarachnoid hemorrhage due to probable ruptured saccular aneurysm with simultaneous, non-contributory heroin use.

CORONARY ARTERY DISSECTION ASSOCIATED WITH ASCENDING AORTIC DISSECTION

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INTRODUCTION: Coronary artery dissection is a rare cause of acute MI - occurring more commonly in women and young patients.

PURPOSE: We present a case of an ascending thoracic aortic dissection with associated left coronary artery dissection and complete lumen compression.

MATERIALS: This case is selected from the files of one of the authors (JP).

CASE REPORT: A 36-year-old male, who was reportedly kicked by a cow one day prior, complained of new onset epigastric pain, left arm pain, and eventually became unresponsive. Autopsy revealed a 3cm partial-thickness intimal tear of the proximal ascending thoracic aorta. The aorta was free of atherosclerosis. An associated left coronary artery (LCA) dissection was contiguous with the aortic dissection, with complete compression of the LCA, as well as the proximal left circumflex and left anterior descending arteries. The myocardium of the anterior left ventricle showed subtle mottling. Postmortem toxicology showed acetaminophen in the urine. There was no evidence of musculoskeletal trauma. The cause of death was coronary artery dissection related to an ascending thoracic aortic dissection. The manner of death was natural.

DISCUSSION: Trauma and atherosclerosis are recognized as common causes of aortic dissection. Despite recent trauma, definite correlation could not be proven. When encountered by an arterial dissection, physicians should be aware of possible predisposing conditions, including fibromuscular dysplasia, inflammatory processes, and connective tissue disorders. In this case, fibroblast cultures were obtained at the request of surviving family members and submitted for evaluation for heritable connective tissue disorders.

MATERNAL DEATH BY FIRE AND FETAL CARBOXYHEMOGLOBIN LEVEL

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INTRODUCTION: The effect of maternal carbon monoxide exposure on fetuses is an under-reported topic. The relationship between maternal carboxyhemoglobin levels and fetal carboxyhemoglobin levels has yet to be fully explained.

CASE REPORT: An 8-month pregnant 35-year-old woman died in a house fire caused by an overloaded extension cord. Postmortem examination documented extensive fire-related changes, which included singed hair, diffuse charring of the skin, skin splits, and soot deposition of the airways. The skin splits were predominantly on the forehead, left temple, perioral region, chin, upper chest, bilateral upper extremities, and lower abdomen. There was dense soot in the nares, oral cavity, and trachea, and scant soot in the bilateral mainstem bronchi and proximal esophagus. The muscles, body cavities, and organs had a bright red-pink discoloration. The decedent's carboxyhemoglobin level was elevated at 51.3%. Her cause of death was inhalation of products of combustion and thermal injuries. The fetus had neither trauma nor malformations. Fetal heart carboxyhemoglobin level was 4.9%.

DISCUSSION: The research on what fetal carboxyhemoglobin levels occur at certain maternal carboxyhemoglobin levels is unclear. While there are some studies on chronic maternal exposure to carbon monoxide (mostly through smoking) and paired fetal and maternal carboxyhemoglobin levels, there are very few case studies available regarding acute carbon monoxide toxicity and concurrent maternal and fetal carboxyhemoglobin levels. This case provides insight into this relationship.

THE IMMUNE FUNCTION OF A PATIENT WITH ITCH E3 UBIQUITIN LIGASE DEFICIENCY

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BACKGROUND: ITCH E3 ubiquitin ligase deficiency is a rare defect associated with multi-system autoimmune conditions. Previous literature has presented the symptomatology, histopathology, and genetics of select Old Order Amish patients with this condition. We present the third report of ITCH E3 ubiquitin ligase deficiency in humans and the first to include laboratory evaluation of the patient's immune function.

CASE PRESENTATION: SS is a 28-month-old unvaccinated Amish female with homozygous ITCH E3 ubiquitin ligase deficiency. She was born to consanguineous parents. A sister died from liver failure at 2 months of age. SS presented with failure to thrive, chronic diarrhea, and chronic lung disease with recurrent viral exacerbations. She developed recurrent pneumonia, recurrent skin/soft tissue abscesses, and oral candidiasis triggering further immune evaluation. Lab results showed normal quantitative immunoglobulins, absent antibody titers to tetanus, diphtheria, and S. pneumoniae, and low titer elevated ANA. She had neutropenia and normocytic anemia during times of illness. During one illness she had moderately reduced T-cell count. Due to difficult venous access, this could not be re-assessed and not all evaluations were able to be completed. The patient ultimately succumbed to respiratory failure from repeated viral pneumonitis.

DISCUSSION: This patient's presentation is in line with previous literature, but we have delineated a more detailed evaluation of the immune system. ITCH E3 ubiquitin ligase is important in promoting Treg differentiation and T cell anergy, and deficiency affects multiple cell signaling pathways and causes lethal autoimmune inflammation in multiple organs.

A CURIOUS CASE OF CONVERSION DISORDER

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INTRODUCTION: Conversion disorder is a functional neurologic symptom disorder, in which there is no neurological etiology, and the symptoms cause impairment or distress (1). About 90% of these patients have a psychiatric comorbidity (2,3,4).

PURPOSE: We present an unusual case of Conversion Disorder in a healthy young male with psychological conflict caused by past events in light of recent life changes.

MATERIALS AND METHODS: Case report information was obtained from patient's chart review, the patient gave consent for presentation of information.

CASE REPORT: A 21 yo male was admitted to the hospital with altered mental status after a reported overdose on Xanax and Adderall. UDS was negative, non-contrast head CT showed no acute changes, and basic labs were within normal limits.

Patient continued to have neurological symptoms, including mutism, shaking, disregarding commands, drooling, and incontinence of urine and stool. EEG and MRI showed no abnormalities. Neurology and psychiatry suggested some component of conversion disorder and possible regression. With supportive care patient recovered enough to admit to a history of depression and anxiety, exacerbated by current life events.

DISCUSSION/CONCLUSION: Symptoms of Conversion Disorder included nonepileptic seizures, weakness, paralysis, movement disorders, speech disturbances, globus sensation, sensory complaints, visual symptoms, and cognitive symptoms, which can be chronic or acute, constant, or intermittent (1,2). This patient's presentation was unusual as there was a component of regression, in the form incontinence, mutism, and refusal to follow commands. Here, we highlight the importance of recognizing conversion disorder and regression and treatment of underlying psychiatric illness.

A PILOT WITHOUT A PLANE: A CASE OF PSEUDOLOGIA FANTASTICA

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Pseudologia fantastica (PF), also known as pathological lying, was first described by Delbruck in 1891. PF involves a pseudologue using enduring deceptions that are not entirely improbable and result in no clear gain. Importantly, when confronted, the pseudologue acknowledges falsehoods distinguishing it from delusion.

Psychiatry was consulted to assess a 37 year-old male, initially presenting with left-sided chest pain, SOB, diaphoresis, and dizziness. Work-up was unremarkable and there was concern for deception. The patient, a California-based, private jet pilot, experienced the symptoms during a flight from Chicago to Kalamazoo. He is quick to share his many successes including playing football and earning an MBA from Stanford, programming for Google, owning restaurants and being financially stable enough to retire young. He does not seek any medication or further medical evaluation. He stated his job would send a private jet to pick him up. Despite his position he has no insurance card, uniform, or aviation ID. Internet search does not corroborate his history and yields a remote history of legal charges. EMR review reveals a consistent history given at previous encounters. His company and the hotel he was to stay at have no record of him. When confronted, he acknowledges his history and its falsehoods.

This case illustrates the nebulous nature of PF and highlights the importance of a better understanding of this phenomenon that does not fit clearly into factitious disorder or malingering, yet remains relevant given the implications of untruths in legal, medical, and social contexts.

LATERAL PROXIMAL PHYSEAL TETHERING AS AN ALTERNATIVE TO EPIPHYSIODESIS USED WITH HEMIPLATEAU ELEVATION OSTEOTOMY TO TREAT INFANTILE BLOUNT DISEASE

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INTRODUCTION: Infantile Blount disease, or bow-legging in children, is caused by decelerated growth of the proximal posteromedial tibial physis leading to tibia vara. Obesity related pressure on the tibial physis increases risk of Infantile Blount disease. Obesity rates are increasing in young children thus, Blount disease will continue to present treatment challenges. For advanced disease, surgical treatment is indicated to realign the limb and joint surface with a hemiplateau elevation osteotomy of the tibia. Typically, surgery involves closure of the growth plate to prevent recurrent deformity, leading to loss of growth, a problem for very young children.

CASE DESCRIPTION: An obese 5-year-old boy with Langenskiöld stage IV infantile Blount disease presented with significant medial tibial plateau depression and recurrent tibia vara despite previous surgical correction at age 3-years. Due to his young age, a novel surgical technique was performed to prevent recurrent deformity while preserving future growth potential. The technique combined a medial hemiplateau elevation osteotomy to correct the articular surface and unload the medial proximal tibial physis with lateral proximal physeal tethering, rather than the traditional epiphysiodesis. The left tibia showed proper alignment of the tibial plateau, appropriate growth from the medial aspect of the proximal tibia, and slight valgus alignment 21-months following surgery warranting tether removal. The patient continues to grow without recurrence of the left tibial varus one year after tether removal.

DISCUSSION: Used together these procedures allowed for correction of alignment in infantile Blount disease while preserving future growth potential, essential for very young patients.

RETROPERITONEAL SCHWANNOMA COMPLICATIONS IN A 36-YEAR-OLD MALE

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Schwannomas are benign, encapsulated tumors typically arising from the Schwann cells of peripheral nerve sheaths and rarely undergo malignant transformation. Majority of schwannomas are asymptomatic, slow growing mass and present in the middle decades of life involving the head, neck or extremities. In rare cases, 1-3% of schwannomas are found in the retroperitoneal space. Typically the tumor is well demarcated without invasion, but may present with significant local adherence.

This is a case of a 36-year-old male who was incidentally found to have a 12.0x10.0x8.3cm retroperitoneal mass in the left pelvis on CT scan during an admission for acute appendicitis. CT-guided biopsy of the mass revealed a benign S100-positive schwannoma. He subsequently underwent exploratory laparotomy for excision of the retroperitoneal schwannoma. Intraoperatively, the mass was found to be tightly adhered to surrounding tissues and vessels posteriorly. Extraction resulted in significant pelvic bleed requiring additional re-explorations and control of postoperative bleeding. Histopathological examination revealed an encapsulated schwannoma with focal features of cystic degeneration. Patient has since been doing well in subsequent follow ups postoperatively.

Retroperitoneal schwannoma are typically asymptomatic, but may present with vague abdominal pain, distention, or other compressive symptoms. Surgical resection is the primary treatment of choice regardless of presence of symptoms given a lack of response to chemoradiation and risk of hemorrhage, growth, and possible malignant transformation. Due to the anatomical positioning and possibility of adherence to neighboring structures, retroperitoneal schwannoma may pose a challenging dissection. Care must be taken to avoid injury to nearby vessels and organs.

RADIATION INDUCED ANGIOSARCOMA OF THE BREAST IN A 74 YEAR-OLD FEMALE

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Radiation induced angiosarcoma (RIA) of breast is a rare, but serious complication of breast conserving therapy for breast carcinoma.

This is case of a 74 year-old-female with history of invasive ductal carcinoma status-post left breast lumpectomy and axillary dissection with adjuvant radiation therapy in 2012. She then presented in July 2018 with a 5.5 x 3.0 cm purpuric lesion on left chest of six month that started bleeding after minor trauma to chest. Subsequent shave biopsy revealed a grade 3 angiosarcoma. She underwent a simple left breast mastectomy with 1.0 cm negative margins.

With increased overall survival and adoption of breast conserving therapy, majority of RIA of chest wall presents in patients with history of breast cancer. The estimated incidence of RIA of breast is around 0.05-0.3% with an average latency period between 4-7 years after radiation therapy. The molecular pathophysiology is thought to be related to an amplification of MYC. Diagnostic criteria was proposed by to include 1) previous history of radiation therapy, 2) development of sarcoma with histologic confirmation in previously irradiated or surrounding tissues, and 3) latency period of 4+ years. Primary treatment of choice is surgical resection with negative margins. However, patients with RIA of breast have a poor prognosis, despite R0 resection, and high recurrence rate with 5-year overall survival at 43% and 5-year disease-free-survival around 32%.

Due to the rare but aggressive nature of RIA and increased prevalence of breast conserving therapy for breast cancer, high level of suspicion is necessary for early detection.

ACUTE COLONIC PSEUDO-OBSTRUCTION (OGILVIE SYNDROME) LEADING TO RESPIRATORY COMPROMISE AND DEATH

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INTRODUCTION: When working with chronically developmentally disabled patients a wide range of comorbidities and social factors must be considered. Children with disabilities have an increased risk of abuse and neglect compared to those without disabilities, and individuals with intellectual disability have a two- to four-fold increased risk for polypharmacy.

MATERIALS AND METHODS: The materials in this report are from the files of one of the authors (JP).

CASE REPORT: A 19-year-old severely disabled man with cerebral palsy (CP) and autism experienced shortness of breath in association with a markedly distended abdomen, and subsequently died. Autopsy revealed significant distention of the small and large intestines, without any sign of perforation or obstruction. Also evident was severe upward compression of the diaphragm with associated pulmonary volume reduction. The cause of death was determined to be respiratory compromise secondary to diaphragmatic compression as a result of acute colonic pseudo-obstruction (ACPO), with contributing underlying factors of CP and autism, including possible medication mismanagement.

DISCUSSION: ACPO is characterized by colon distention without an apparent mechanism of mechanical obstruction. There are a number of conditions known to be associated with ACPO, and only 5.5 percent of reported cases are idiopathic. While there has not been a statistically proven association with cerebral palsy, cases have been reported. Treatment ranges from conservative measures such as cessation of contributing medications and administration of laxatives to surgical intervention.

CONCLUSION: This case serves to inform clinicians and pathologists about ACPO and its potential for being lethal, especially in severely disabled patients.

TRENDS AND 30-DAY READMISSION RATE FOR PATIENTS DISCHARGED WITH DIABETES MELLITUS WITH COMPLICATION: ANALYSIS OF 1,457,583 ADMISSIONS.

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INTRODUCTION: Diabetes mellitus (DM) with complication is a major cause of morbidity and mortality and is associated with a high re-admission rate (RR) and economic burden on health care. This study was done to determine demographic parameters associated with high RR secondary to DM.

METHODS: Nationwide Inpatient Sample data was used to extract data of patients discharged with DM for year 2012-2014 using clinical classification software (CCS). NIS represents 20% of all hospital data in US. All the patients who were discharged with primary diagnosis of DM with complications and readmitted within 30 days were identified and categorized based on admitting diagnosis. Patients were classified as readmissions secondary to DM with complication as primary cause, readmissions with DM with complication as secondary cause and non-DM associated readmissions. Chi-square analysis was done for statistical significance.

RESULTS: We identified a total of 1,457,583 admissions for DM nationwide during the study period with total 30-day RR of 45.7%. 30-day RR for DM as primary diagnosis accounted for 9.1%. Age group (18-44), females, patients under Medicaid and living in metropolitan areas had higher 30-day RR secondary to DM as a primary cause and secondary to non-DM related causes ($p<0.01$).

CONCLUSION: Our study identifies the demographic parameters associated with high 30-day readmission rate for Diabetes mellitus with complications. It reveals that DM with complications is associated with high 30-day RR. Strategies to reduce morbidity and healthcare cost should be targeted more in these groups with high RR.

DRUGS THAT MAKE YOUR SKIN REACT - CASE OF STEVEN-JOHNSON SYNDROME ASSOCIATED WITH ADALIMUMAB THERAPY

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While most drug reactions are benign and self-limiting, Steven-Johnson syndrome is a serious cutaneous reaction associated with 1-5% mortality. Early recognition is critical to ensure prompt drug discontinuation and preventing further complications.

A 20-year-old Caucasian female, with history of psoriasis, presented to the emergency department for evaluation of a progressively worsening rash, different from her psoriasis flares. A week before the presentation, patient developed palmer and planter itching. This was followed by appearance of small macules on her palms and soles, which rapidly spread to the proximal parts of her extremities and trunk. She had associated lip swelling, painful oral lesions and odynophagia. She reported subjective fevers, denied recent travel or tick bites. Further investigation revealed that she was switched from Etanercept to Adalimumab, for psoriasis, two months prior to this episode and had received a total of 4 doses. Her physical examination was significant for diffuse erythematous patches with dusky center extending proximally on arms and legs, some starting to crust. She had oral muco-cutaneous lesions with erosions on hard palate and tongue. Workup, including HIV screen, CMV IgM, EBV IgM, Parvovirus, Varicella and syphilis serology, were negative. Adalimumab was held, dermatology was consulted, and she was started on cyclosporine for Steven-Johnson syndrome with significant improvement in her symptoms.

The incidence of Steven-Johnson syndrome with Adalimumab is less than 1%. It typically develops within 1-4 weeks of drug initiation. There is increasing evidence than cyclosporine can slow the progression of disease process, as noted in our patient.

WHO ORDERED THE ANTIPLATELET THERAPY?: ANALYSIS OF ED PROVIDER USE OF ANTIPLATELET THERAPY IN THE SETTING OF CVA AND TIA

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BACKGROUND: Ischemic Cerebrovascular Accidents (CVAs) and Transient Ischemic Attacks (TIAs) are a growing cause of significant morbidity and mortality worldwide. Current guidelines recommend antiplatelet therapy within the first 48 hours for proven benefit in these patients.

OBJECTIVE: To assess how often emergency medicine (EM) providers are ordering antiplatelet therapy for TIA/CVA patients prior to disposition from the emergency department (ED).

METHOD: A retrospective chart review from January 1, 2016 through November 30, 2017 was performed on all patients who presented at Borgess Emergency Department and diagnosed with TIA/CVA. The primary outcome was to determine the rate at which emergency medicine providers are prescribing antiplatelet therapy on qualified patients in accordance with early management of acute ischemic stroke. Exclusion criteria was deemed for patients who received thrombolytics as therapeutic intervention, presented with symptom onset greater than 48 hours, those with an allergy to aspirin, all those already previously prescribed antiplatelet therapies, or who received aspirin in the pre-hospital setting.

RESULTS: Data was collected from 257 patient encounters. 81 patients were diagnosed with acute TIA/CVA who did not meet the previously defined study exclusion criteria. 40 (49.4%) of these patients were prescribed antiplatelet medication by the emergency medicine provider. However, 100% of patients did receive ASA within 48 hours.

CONCLUSION: There is opportunity for improvement for emergency department providers to initiate antiplatelet therapy for TIA/CVA patients. However, further inquiry is required to determine if this would lead to improved patient outcomes.

FORGOTTEN BUT NOT GONE: HYPERTHYROIDISM IN A PATIENT WITH PRIOR TOTAL THYROIDECTOMY

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BACKGROUND: Forgotten goiters, or mediastinal thyroid tissue discovered years after total thyroidectomy, are exceptionally rare occurrences; one study of 3,044 patients with prior total thyroidectomy identified only 10 instances of goiter recurrence over a 25-year period. Forgotten goiters are typically non-functional, and present with symptoms of mass effect in patients maintained euthyroid through the use of thyroid hormone replacement. The anti-arrhythmic amiodarone is known to alter thyroid dynamics in 32% of treated patients, with 3% of patients developing amiodarone induced thyrotoxicosis (AIT). A subset of those patients demonstrates AIT type 1; endogenous thyroid hormone production from an abnormal gland upon exposure to amiodarone (an example of the Jod-Basedow phenomenon).

CASE HISTORY: An 81-year-old man with remote history of "total thyroidectomy", chronically treated with levothyroxine, presented to his primary care physician. He had recently been hospitalized with atrial flutter for which he had DC cardioversion and was discharged on amiodarone. Five years earlier, a substernal paratracheal mass was identified as minimally functioning thyroid tissue. At the time of his current appointment the patient was found to be hyperthyroid. Subsequent follow up labs demonstrated continued increases in free thyroxine levels despite discontinuation of his levothyroxine. This suggested new, autonomous function of his mediastinal thyroid mass.

DISCUSSION: This case highlights a rare occurrence of activation of a "forgotten goiter". A clinically non-functional mass, with over 15 years of regular thyroid function monitoring, which gained autonomous function upon exposure to amiodarone, subsequently converting the previously euthyroid (on replacement hormone) patient to a hyperthyroid state.

A SURPRISING CASE OF ADULT INTUSSUSCEPTION IN A PATIENT WITH PRIOR ILEOCOLIC ANASTOMOSIS

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INTRODUCTION: Intussusception is defined as the telescoping of a proximal segment of bowel into a distal segment. Intussusception is the second leading cause of acute abdomen in children, but it only represents approximately 5% of all bowel obstructions in adults. Furthermore, adult intussusception accounts for only 5% of all cases of bowel obstruction. In pediatrics intussusception is usually primary, while intussusception in adults are usually secondary to neoplasm.

CASE REPORT: Our patient was a 68-year-old male with a past medical history of Crohn's disease treated with open ileocecectomy over 30 years prior, who presented to the outpatient clinic with worsening malnutrition and electrolyte imbalances. The patient exhibited limited symptoms of chronic obstruction and pre-operative imaging showed dilated loops of small bowel with wall thickening at the site of the ileocolic anastomosis, thought to be due to stricture. The patient was consented for laparoscopic ileocolic resection. Upon visualization of the small bowel it was found that the proximal portion of the ileocolic anastomosis had intussuscepted into the distal colon. The portion of the intussusception was surgically removed and the remaining portions of the small bowel and colon were anastomosed. The patient had no evidence of active Crohn's disease.

CONCLUSION: Intussusception is a rare cause of small bowel obstruction in the adult population and is a challenging preoperative diagnosis to make because symptoms are nonspecific. However, physicians should always consider the possibility of intussusception when non-specific obstructive and malnutrition symptoms are present, even when not evident on pre-operative imaging.

CHALLENGES IN THE DIAGNOSIS OF GALLBLADDER VOLVULUS

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BACKGROUND: Gallbladder volvulus is a rare condition that poses a challenge to surgeons and radiologists due to its overlapping presentation with acute cholecystitis. First identified in 1898, only 500 cases have since been documented in the literature. Here, we present a rare case of gallbladder volvulus managed successfully with an emergent cholecystectomy.

METHODS: Materials for this case report were obtained through chart review and photographs taken peri-operatively by the authors.

CASE PRESENTATION: A 95 year-old female presented with diffuse right upper quadrant abdominal pain. CT scan of the abdomen revealed a distended, oddly-shaped cystic structure in the region of the gallbladder fossa. The official radiology report noted that the structure possibly represented the gallbladder, although it appeared oddly-shaped. Further investigation with a HIDA scan and right upper quadrant ultrasound created a high suspicion for cholecystitis prompting surgical intervention, which revealed a necrotic bile-filled gallbladder that had twisted on its mesentery. Following cholecystectomy, the patient made a full recovery with no complications.

DISCUSSION: Gallbladder volvulus classically affects elderly patients between the ages of 60 and 80 with a 3:1 female predominance. This is likely due to a loss of visceral fat predisposing the gallbladder to rotate along the axis of the cystic duct and artery. Signs and symptoms closely mimic cholecystitis, but pre-operative diagnosis is quite difficult due to inconclusive radiologic findings. Prompt identification and early laparoscopic cholecystectomy are critical in the prevention of serious complications.

SPONTANEOUS RETROPERITONEAL BLEED IN AN ELDERLY PATIENT ON APIXABAN

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INTRODUCTION: Up to 5% of patients on anticoagulants suffer from a major bleed annually, including gastrointestinal and intracranial bleeds. Although rare, spontaneous retroperitoneal hemorrhages can also occur, and have a mortality rate as high as 20%. Use of oral anticoagulants is increasing, thus recognition of life-threatening complications is critical.

CASE HISTORY: An 86-year-old female taking 5 mg BID apixaban for stroke prophylaxis due to atrial fibrillation presented to an emergency department with atraumatic right hip pain. She was afebrile with a pulse of 65 and a blood pressure of 158/67. Her physical exam revealed thigh tenderness and pain with hip flexion. Lab results included a hemoglobin of 11.7 g/dL, creatinine of 1.02 mg/dL, glomerular filtration rate of 50, INR of 1.1, and an aPTT of 25.8. A computed tomography scan demonstrated a 5cmx3cmx10cm retroperitoneal hemorrhage in the right iliacus muscle. The patient was admitted to the ICU and treated with supportive care for 48h before being discharged.

DISCUSSION: Due to vague presentation, spontaneous retroperitoneal hemorrhage can be misdiagnosed as many abdominal and pelvic pathologies. Common symptoms include abdominal, hip, and back pain. It can progress to hemodynamic instability, femoral neuropathy, or abdominal compartment syndrome; these require rapid intervention, and may lead to substantial morbidity. In patients with vague abdominal or pelvic complaints with risk factors such as advanced age and anticoagulant use and considering that spontaneous retroperitoneal hemorrhages are misdiagnosed 10% of the time, keeping this diagnosis in the differential can allow for earlier treatment before severe complications arise.

A COMPARATIVE ANALYSIS OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION REHABILITATION PROTOCOLS IN SOUTHWEST MICHIGAN

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BACKGROUND: A thorough rehabilitation program is critical to achieving a satisfactory outcome following anterior cruciate ligament reconstruction (ACLR). However, there remain gaps in knowledge and there is yet to be a single consensus rehabilitation protocol. The purpose of our study is to identify areas of ACLR rehabilitation in which patient outcomes could be improved through further research.

HYPOTHESIS: There are differences in the ACLR rehabilitation programs used by surgeons and these differences are not supported by evidence in literature.

METHODS: ACLR rehabilitation protocols were acquired and compared from six different Orthopaedic Surgeons in Southwest Michigan from different physical therapy facilities. Protocol directives were categorized as bracing, range of motion, weight bearing, strengthening, neuromuscular training, and sport functional exercises.

RESULTS: There is a significant variation in rehabilitation protocols with respect to bracing, strengthening, neuromuscular training, and sport functional exercises. The lack of use of post-operative bracing was supported by the literature. Differences in the initiation of various exercises had no studies in the literature to demonstrate medical evidence. Weight bearing status was the only category in which there was a universal consensus within all protocols.

CONCLUSION: There are many differences between surgeons' protocols for ACLR rehabilitation following surgery. Many of the differences cannot be supported by medical evidence seen in the literature. This may suggest that current practice guidelines for rehabilitation protocols for ACLR are products from the surgeons' postgraduate training. Efforts should be made to improve existing rehabilitation protocols with appropriate medical evidence, which would help improve patient outcomes.

ACCIDENTAL HANGING: A CASE OF AUTOEROTIC ASPHYXIATION DETERMINED AFTER ADDITIONAL INFORMATION FROM FAMILY

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INTRODUCTION: The rate of suicide in the United States has increased over the last ten years, much of which is attributed to asphyxia by hanging. The majority of hanging deaths are relatively straightforward when opining manner of death, most commonly suicide. However, when details from the scene investigation contradict findings consistent with a suicide, obtaining additional information before concluding a manner of death is essential.

CASE HISTORY: A 29-year-old man was found dead from a reported suicidal hanging. No suicide note or signs of struggle were observed at the scene. Important death scene details were critical to understand the circumstances of the decedent's death. These include the ligature, decedent's attire, specific items in the room photographed by the medical examiner investigator and additional history provided by family members during subsequent conversations with the medical examiner's office. Ultimately, the medical examiner concluded the hanging was accidental, likely due to autoerotic activity.

DISCUSSION: Factors that may trigger the need for additional information in a hanging death include the lack of a history of depression, suicidal trigger, or departure note at the death scene; evidence of solitary sexual activity; or a young impressionable decedent. Before opining manner of death in hanging deaths, medical examiners should consider investigative details and information provided by family members beyond that obtained from the initial death scene investigation and findings at the postmortem examination. Accuracy in manner of death determinations can have a lasting impact on family members as well as public health policies and initiatives.

CASE REPORT: A CONGENITAL NEUROBLASTOMA PATIENT WITH BRAIN METASTASES.

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Neuroblastoma (NB), the most common extracranial tumor of childhood, accounts for 15% of all pediatric oncology deaths. Congenital neuroblastoma is rare with less than 100 cases described in the literature. The central nervous system (CNS) is an uncommon site for dissemination and accounts for 0.7% of cases. Crizotinib is an anaplastic lymphoma kinase (ALK) inhibitor therapy that is currently undergoing clinical trials for treatment of NB.

We detail the clinical course of a four-month-old boy with congenital, stage IV NB. Prenatal ultrasound at 37 weeks and 5 days detected a mass above right kidney. Computed tomography (CT) showed right adrenal neoplasm with hepatic metastases. Metaiodobenzylguanidine scan and elevated urine catecholamines were consistent with NB. Patient was enrolled in the Children's Oncology Group Protocol ANBL1232 for non-high-risk NB. Repeat CT after two cycles of chemotherapy showed decreased in size of right adrenal mass and liver lesions. Biopsy of tumor revealed positive ALK and amplified N-Myc. Patient developed a seizure and CT of the brain found masses suggestive of metastases, confirmed by magnetic resonance imaging (MRI). Given the ALK and N-Myc status, patient was switched to the ANBL 1531 for high-risk NB.

According to ANBL 1232, the first two cycles were Carboplatin/Etoposide and Carboplatin/Cyclophosphamide/Doxorubicin, respectively. After the transition to ANBL 1531, the regimen included Cyclophosphamide/Topotecan and Crizotinib for the ALK positive status. Our patient was the youngest to receive Crizotinib. Despite the change in therapy, his clinical course continued to worsen, and he passed a month after the diagnosis of brain metastasis.

MIND-BODY PRACTICES DELIVERED IN A CANCER INFUSION SUITE TO REDUCE SYMPTOMS AND IMPROVE WELL-BEING: A PRACTICE-BASED STUDY

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PURPOSE: Anxiety, pain, nausea, and fatigue are common side effects of patients undergoing chemotherapy. Mind-body practices (e.g., yoga, relaxation/breathwork, auricular acupuncture) have been shown to be effective in reducing symptoms in outpatient settings. The purpose of this study was to assess the use of mind-body practices delivered during cancer infusion, and to examine changes in symptoms before and after the intervention.

METHODS: Two mind-body practitioners delivered services within a cancer infusion suite as part of an Academic Health Center's Integrative Medicine program. A variety of practices were utilized depending on patient preference and practitioner expertise. A pre and post-intervention survey was collected by the therapist, who asked patients to rate current symptoms (pain, nausea, fatigue, anxiety, overall distress) on a scale from 0-10. Qualitative data were also collected via unprompted patient feedback.

RESULTS: 191 patients, with various cancers and blood disorders, participated in this study from April 2016 to July 2017, with 86% (n=165) of participants completing both pre and post surveys. Levels of anxiety (Mpre=3.61/Mpost=1.73, $p< 0.01$), pain (Mpre=1.82/Mpost=1.02, $p<.01$), nausea (Mpre=.72/Mpost=.326, $p<.05$), and overall distress (Mpre=3.48/Mpost=1.83, $p<0.01$) all significantly decreased post intervention.

CONCLUSION: In this practice-based study, clinical symptoms significantly decreased following a mind-body intervention in a cancer infusion infusion suite delivered at the point of care. Future studies should use objective raters to assess symptom reduction. Mind-body practices delivered during infusion services may provide symptom reduction for patients and should be rigorously assessed for dose, individualized preference, and long-term symptom improvement.

SPONTANEOUS PERITONITIS AND ESCALATING THERAPY FROM BACTERIAL TO FUNGAL: A CASE REPORT AND REVIEW OF THE LITERATURE

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Here we present a case of spontaneous fungal peritonitis, initially misdiagnosed as spontaneous bacterial peritonitis, and a review criterion for patients requiring early empiric antifungal therapy.

A 67 year old diabetic man with decompensated NASH cirrhosis and CKDIII presented with acute kidney injury, abdominal pain and tenderness suggestive of spontaneous bacterial peritonitis (SBP) - Rocephin was started empirically. Paracentesis revealed >4000 PMNs, confirming SBP. A Nephrology consultant diagnosed hepatorenal syndrome type 1.

On day 2, during hemodialysis, his mental status deteriorated and he developed respiratory distress and hypotension. Emergently transferred to the ICU for intubation, clinicians added Vancomycin, Cefepime and Flagyl for septic shock. At 48 hours, follow-up paracentesis demonstrated 3600 PMNs, suggesting failure of SBP therapy. Candida glabrata grew from the initial paracentesis culture on day 3 and empiric Micafungin therapy was initiated. On day 4 his clinical status worsened, prognosis appeared dismal, and the family elected comfort care.

Effective medical therapy for SBP lacks coverage for spontaneous fungal peritonitis (SFP). When SBP therapy fails, SFP becomes a consideration. Mortality of SFP remains high at 50-100% due to the delay in culture-based fungal therapy initiation. Literature suggests antifungal initiation at 48 hours does little to change initial prognosis, thus earlier initiation might improve the outcome. Consider ascitic fluid fungal PCR for early diagnosis when SFP is suspected. We present criteria that can delineate patients at high risk for SFP so that early initiation of empiric antifungal therapy might improve overall prognosis.

PERSISTENT HEART FAILURE FOLLOWING MELPHALAN AND FLUDARABINE CONDITIONING

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Introduction: Advances in chemotherapy and radiotherapy have greatly improved cancer survival, however their side effects can sometimes be more dangerous than the cancer itself. Understanding these risks is especially important when the consequences are as life threatening as heart failure. Melphalan and Fludarabine are drugs used in many chemotherapy regimens and are not usually associated with cardiotoxicity. In this report, we present a patient that developed persistent heart failure after conditioning with these drugs for a bone marrow transplant.

Case History: A 48-year old woman with an 8-year history of refractory Mycosis Fungoides underwent chemotherapy and an allogenic bone-marrow transplant. Her baseline echocardiogram showed normal left ventricular function. On the fourth day of chemotherapy with Fludarabine 30mg/m2 and Melphalan 70mg/m2 she presented with pulmonary edema and her ejection fraction was 45% and further reduced to 23% 3 days later.

Discussion/Conclusion: While cardiac dysfunction is a well-known adverse effect for other chemotherapies, it has not been heavily associated with Melphalan or Fludarabine use. Our patient not only developed the rare side effect of acute heart failure during her chemotherapy, but more unusually had persistent systolic heart failure 6 months after the transplant. Future research into preventative measures of the cardiotoxic effects of anticancer therapy is key to ensuring reduced risk of adverse cardiac events.

A UNIQUE CASE OF OSTEOMYELITIS CAUSED BY GARDNERELLA VAGINALIS AND STREPTOCOCCUS PARASANGUINIS IN A POST-MENOPAUSAL WOMAN

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BACKGROUND: Vertebral osteomyelitis or discitis is an infection of the vertebrae and intervertebral discs that can lead to spinal instability and neurologic deficits. It is most frequently caused by Staphylococcus aureus and is growing in incidence due to longer life expectancy and clinical ascertainment.

CASE HISTORY: A 61-year-old post-menopausal woman, who had recently become sexually active after having been celibate for over 10 years, presented with 2-weeks of progressive lower back pain and fever. She had a history of fibromyalgia, chronic back pain with prior L2-L3 fusion, and a recent episode of cystitis. Magnetic resonance imaging (MRI) revealed L3-L4 discitis and osteomyelitis of L4 (and likely L3) and paraspinous phlegmon with a right psoas muscle abscess. Cultures from a needle aspiration of right psoas muscle abscess grew Gardnerella vaginalis and Streptococcus parasanguinis. The patient was treated with a 6-week course of IV ceftriaxone and oral metronidazole.

CONCLUSIONS: This case represents an unusual co-infection of G. vaginalis and S. parasanguinis. These organisms are normally associated with infections of the genital tract and oral cavity, respectively. This case highlights the potential for Gardnerella to cause infection in atypical locations outside of the genital tract. The report also suggests that re-engagement of sexual activity by post-menopausal women may be a risk factor for opportunistic bacterial infections, including G. vaginalis induced spinal osteomyelitis.

DEATH RELATED TO EPIGLOTTITIS

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INTRODUCTION: Epiglottitis is a condition wherein the epiglottis is inflamed, often as a result of a bacterial infection. The condition may be associated with marked swelling, which, on occasion, may result in airway compromise.

PURPOSE: We present a case of death related to epiglottitis in a middle-aged man.

MATERIALS: The case is from the files of one of the authors (JP).

RESULTS/CASE REPORT: A middle-aged man collapsed while at a pharmacy awaiting a prescription for a nasal decongestant which had been prescribed to him during a visit to an emergency department (ED) earlier that day. He had presented to the ED with complaints of a sore throat and bilateral ear pain. Paramedics responded to the pharmacy and found the man in respiratory distress. He was taken to the ED, where lab tests revealed a neutrophilic leukocytosis and a markedly elevated blood glucose level. He was admitted to the intensive care unit with anoxic encephalopathy and died 2 days later. A throat culture grew beta-hemolytic Streptococcus. An autopsy revealed a swollen and purulent epiglottis, which, on microscopic exam, had intense neutrophilic inflammation. The cause of death was acute epiglottitis.

DISCUSSION/CONCLUSION: Although epiglottitis is well-described in the medical literature, the condition is not as common as it once was. As the condition is now considered to be rare, clinicians must be vigilant in identifying cases and instituting appropriate treatment. Failure to do so may result in loss of life, as the current case exemplifies.

MOREL-LAVALLÉE LESION: A CLOSED DE-GLOVING INJURY

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INTRODUCTION: Morel-Lavallée lesions (MLLs) are uncommon closed, degloving injuries secondary to blunt or shear trauma causing deep investing fascia to separate from underlying musculature creating a pathological space. Disruption of vessels and accumulation of fluid within the space causes necrosis of surrounding tissue. One-third of MLLs are missed at acute presentation, likely due to unfamiliarity. Untreated MLLs may become infected or progress to a capsule, which complicates management. MLLs are most often seen with orthopedic trauma. Hip injuries account for 30.4% of cases, rare leg lesions account for only 1.5% of cases.

CASE REPORT: A 66-year-old male presented to emergency department with shearing trauma to the anterolateral leg, tenderness, erythema, ecchymosis, swelling and skin avulsion. X-ray and ultrasound ruled out fracture and deep vein thrombosis, respectively. Cellulitis was diagnosed presumptively and treated with oral antibiotics. The non-healing lesion prompted wound care consultation with a working diagnosis of refractory cellulitis. The patient was subsequently found to have an area of necrotic tissue and hematoma superficial to the deep fascia. Irrigation and debridement followed by post-operative wound care provided definitive resolution.

DISCUSSION: MLLs should be considered in patients with a history of shearing trauma followed by focal pain, swelling, and ecchymosis. For this case of a non-healing lesion, fluctuant mass, and necrosis of surrounding tissue, the pathology is consistent with an MLL. MLL is a clinical diagnosis; however, MLLs are best visualized with MRI. Management can be conservative (ex. compression bands), but severe cases may require surgical intervention.

SUNITINIB-INDUCED PNEUMATOSIS INTESTINALIS IN A PATIENT WITH MULTIPLE MALIGNANCIES

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Sunitinib is a multi-tyrosine-kinase inhibitor that is an approved therapy for gastrointestinal stromal tumor (GIST). A side effect sparsely documented in case reports is pneumatosis intestinalis (PI). We present a case of sunitinib-induced PI in a patient with multiple malignancies.

A 66-year-old female presented to the ED with abdominal pain and diarrhea. Her medical history included metastatic breast cancer and recurrent GIST, for which sunitinib was added five months prior to presentation. The patient was afebrile and hemodynamically stable, with no peritoneal signs. Imaging revealed PI involving the distal ileum and proximal colon. She was taken for exploratory laparotomy and found to have bowel crepitance, though the bowel was viable and without perforation. The abdomen was closed without intervention. Sunitinib was stopped and the patient made a complete recovery, with resolution of the CT findings.

A small but growing body of evidence demonstrates PI as a side effect of sunitinib. The pathogenesis is likely related to its activity against vascular endothelial growth factor (VEGF), and has been proposed to be a potential class effect of all anti-VEGF agents. These agent's effect on capillary beds can lead to intestinal wall microperforation over time, and as such it is consistently documented that PI tends to occur after several months of sunitinib exposure. PI is associated with both benign and life-threatening conditions. In benign causes, conservative management is preferred. Increasing awareness of sunitinib as a cause of PI may reduce unnecessary surgical procedures, particularly in patients without peritonitis or hemodynamic instability.

ACUTE CALCIFIC LONGUS COLLI TENDONITIS: A MIMICKER OF MENINGITIS

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INTRODUCTION: Acute calcific tendinitis (ACT) of the Longus Colli muscle also otherwise known as retro-pharyngeal tendinitis or acute calcific prevertebral tendinitis, is a self-limiting inflammatory condition presumably caused by calcium hydroxyapatite deposition in the longus colli tendon. The ACT often presents with acute posterior neck pain, neck stiffness, dysphagia, odynophagia, and mild fever. The clinical presentation can sometime be confusing and seems like patient is having signs of meningismus.

CASE PRESENTATION: A 40 year old previously healthy female presented with a day history of headache, neck pain and stiffness to the clinic. The symptoms were associated with odynophagia, dysphagia and nausea, but she denied any fever, chills, vision changes, dizziness or photophobia. Concerning for Meningitis, she was referred to the ER. CT head w/o contrast negative for anybleed/mass/inflammation. She had an LP that was unrevealing for any infectious pathology. She was discharged from the ER to home. Later she presented to the clinic for follow up, still complaining of the similar symptoms. With concerns for deep space infection versus cervical paraspinal muscle spasm, CT soft tissue neck with contrast was ordered that clinched the diagnosis.

DISCUSSION: This most commonly occurs in age group between 30-60. The exact etiology of calcium hydroxyapatite crystal deposition is still poorly understood; however, some investigators hypothesize that repetitive ischemia, trauma, and degeneration contribute to the pathogenesis of ACT. The longus colli muscle has three parts: upper-, vertical- and lower oblique fibers and is located in the prevertebral area. The ACT is an inflammatory process.

QUALITY IMPROVEMENT IN CF CLINIC: PATIENT DOWNTIME AND CLINIC WORKFLOW

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BACKGROUND: In July 2018 a quality improvement (QI) Cystic Fibrosis (CF) Foundation grant, FUN to OneCF, LLC, was awarded to improve overall QI process through QI instrument education and live coaching. The global aim was to improve CF Center organization. In late 2018 Patient Care Satisfaction surveys were sent to Cystic Fibrosis (CF) adult patients and caregivers of child patients. The highest frequency complaint was time in CF Clinic appointment, in particular, downtime without a clinical team member in the appointment.

SPECIFIC AIM: To assess and reduce the overall length of appointments while maintaining quality multidisciplinary care, the aim of decreasing downtime from 45 minutes to 30 minutes by October 2018 was established.

METHODS: Time Cycles in the clinic were collected. The average downtime was 45 minutes. Clinic process flow, resources needed, communication challenges and brainstorming were used to develop Plan-Do-Study-Act (PDSA) cycles.

PDSA #1: Pre-visit planning
PDSA#2: Pre-visit call
PDSA #3 implementation of a "closer"

RESULTS: The goal of 30 minutes downtime was exceeded, averaging downtimes of 20-30 minutes. Patients indicate they appreciate the QI efforts, decreased downtime and decreased length of appointments.
Conclusions: Participation in the collaborative and live coaching improved communication among CF Clinic team members. Use of QI tools and regular coaching improved clinic visit downtime and overall clinic flow.

ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY IN A YOUNG ATHLETE

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INTRODUCTION: Sudden death in young athletes is rare, with an incidence of 0.61/100,000 person-years in the United States1. Etiologies may be divided into cardiac and non-cardiac, including but not limited to hypertrophic cardiomyopathy, coronary artery anomalies, valvulopathies, hyperthermia, sickle cell disease, and illicit drug use2.

PURPOSE: We present a case of arrhythmogenic right ventricular cardiomyopathy (ARVC) resulting in sudden death in a high school athlete.

MATERIALS: This case is selected from the files of one of the authors (JP).

CASE REPORT: A 17-year-old male with an unremarkable medical history suddenly collapsed while running at football practice. All resuscitative efforts failed. Autopsy revealed a 510g heart with a markedly dilated right ventricle, with multifocal areas of wall thinning and apparent fatty infiltration. The left ventricle demonstrated concentric hypertrophy. Coronary arteries were unremarkable, as were the cardiac valves. Microscopic exam revealed right ventricular myocyte loss with replacement by fibrofatty tissue. Remainder of the autopsy was negative except for mild chronic asthmatic changes. Serum and urine drug screens were negative. The cause of death was ARVC. The manner of death was natural.

DISCUSSION/CONCLUSION: ARVC is an inherited cardiomyopathy with variable expressivity and incomplete penetrance often resulting in heart failure or sudden cardiac death3. It is characterized by segmental and multifocal fibro-fatty replacement of the right ventricle free wall - making early diagnosis challenging3. ARVC accounts for 2.1-4.0% of total sudden deaths in young athletes and thus should be considered as a possible cause in similar cases1,3.

AN INTERVENTION DESIGNED TO INCREASE POST-PARTUM VISIT ATTENDANCE RATES AT A FEDERALLY QUALIFIED HEALTH CENTER

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INTRODUCTION: Kalamazoo County has a high infant mortality rate, 6.7 per 1000 live births from 2013-2017. The initial 6 weeks post-delivery can be crucial to evaluate medical complications, provide contraceptive counseling, screen for postpartum depression and evaluate other social concerns. This project was designed to improve post-partum visit attendance and neonatal mortality at a federally qualified health center in Kalamazoo County.

METHODS: All patients that were seen for prenatal care by the WMED Family Medicine Residents were enrolled into this study. Scheduling templates were developed in which newborn and maternal post-partum visits were scheduled together. We compared post-partum attendance rates from 01/01/2017-12/31/2017 to 08/07/2018 (Implementation of couplet scheduling) to current. Data was collected at three-month intervals. Improvements in postpartum visit attendance rates were analyzed using the Chi-square test of independence. We also examined which factors are significantly related to post-partum visit attendance including whether this was a woman's first pregnancy, age at delivery, race, ethnicity, primary language, gestational age at first prenatal care visit, number of prenatal care visits, gestational age at delivery and infant gender. To quantify the effect of each factor on attendance we used odds ratios and Bonferroni adjusted confidence intervals.

RESULTS/CONCLUSION: Prior to implementation of this study, attendance rates for postpartum visits were 48%. Following implementation there is a significant increase of post-partum visit attendance rates by 79%. Although, data at this time is limited to the first 6 months from implementation, we foresee a steady rise as we continue collecting data.

CENTRAL SLEEP APNEA THOUGHT TO BE A RESULT OF STRANGULATION AS A PRESENTING SYMPTOM OF MUSK POSITIVE MYASTHENIA GRAVIS

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INTRODUCTION: Myasthenia Gravis (MG) is a chronic autoimmune neuromuscular disease characterized by the presence of autoantibodies against the skeletal muscle acetylcholine receptor (AchR), muscle-specific receptor tyrosine kinase (MuSK), or low density lipoprotein receptor related protein 4 (LRP4). It causes muscular weakness commonly affecting muscle groups that control eye and eyelid movement, facial expression, chewing, talking, and swallowing. Sleep disorders are a major causes of mortality in patients with neuromuscular diseases, yet the prevalence with MG is poorly documented in literature. An estimated 30% of MG patients will develop some degree of respiratory muscle weakness; with 15-20% of these patients requiring ventilator support

CASE DESCRIPTION: We present a case of a 27-year-old African American female that arrived to the ED after being choked and struck in the face by her partner. During her hospitalization she continued to have respiratory depression, intermittent somnolence and cognitive delays. Initial presentation was most consistent with anoxic brain injury secondary to the strangulation; but later she was diagnosed with central sleep apnea. She subsequently required assisted ventilation at night. Her complaints also highlighted a predominance of bulbar symptoms including ptosis, dysphagia and dysarthria. Further workup including Acetylcholine receptor antibodies was negative, but positive Anti-MuSK antibodies were noted. Following treatment with IVIG, prednisone, and Mesiton, the patient returned to work with significant improvements in both speech and strength.

PSEUDO-HORSESHOE LUNG HERNIATION FOLLOWING TRACHEOESOPHAGEAL FISTULA REPAIR IN A CHILD WITH SITUS INVERSUS TOTALIS

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INTRODUCTION: Tracheoesophageal fistula with esophageal atresia (TEF-EA) is a common congenital upper respiratory tract malformation requiring surgical repair. Situs inversus complicates the surgical approach of TEF-EA repair. We describe an extremely rare complication of TEF-EA surgery, a pseudo-horseshoe lung herniation in a patient with situs inversus totalis.

CASE HISTORY: A four-year-old girl presented with respiratory distress and severe cough. Past medical history included TEF-EA surgical repair via open thoracotomy, situs inversus totalis, an atrial septal defect, and recurrent pneumonia. Due to the recurrent pneumonia, impaired airway clearance, and situs inversus, primary ciliary dyskinesia was suspected. Bronchoscopy elucidated bronchomalacia in the left subsegmental airway. Subsequent chest x-ray showed an abnormal lucency in the left lower lobe region. Computed tomography revealed the left lung was hyperinflated and herniated across the midline. The herniated lung section had no visible arterial supply, suggesting abnormal pseudo-horseshoe lung, rather than sequestration. Lung herniation occurred through the site of TEF-EA repair.

DISCUSSION: There are no known reports of such a lung herniation following TEF-EA repair. The patient's primary ciliary dyskinesia, atrial septal defect, and passive smoke exposure likely contributed to recurrent pneumonia and severe cough. Increased pleural cavity pressure generated by violent coughing may have provided enough force to cause the lower segment of right lung to herniate through the hole remaining from TEF repair. Bronchoscopy and persistent data collection were crucial in diagnosing such a rare complication causing serious morbidity in a patient with a complex constellation of symptoms.

GETTING THE GIST: AN UNUSUAL PRESENTATION OF A GASTROINTESTINAL STROMAL TUMOR

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Gastrointestinal stromal tumors (GISTs) are common tumors of the gastrointestinal tract that derive from malignant precursors of the interstitial cells of Cajal affecting mostly middle aged to elderly patients. GIST's are most commonly found within the stomach in 60-70% of patient, while 25-35% are located in the small intestine. In 2018, a 50-year-old woman presented to an urgent care center for one day history of acute abdominal pain associated with nausea and emesis. An upright chest x-ray and abdominal x-ray demonstrated a free air under the diaphragm. The patient was transferred to the emergency department (ED). Presenting with tachycardia, hypotension, and diffuse right-sided tenderness, she was soon taken emergently to the operating room where she underwent a diagnostic laparoscopy that demonstrated a significant inflammation and contamination in the right side of the abdomen and pelvis secondary to perforated small bowel diverticulum, in the mesenteric side, 100 cm proximal to the cecum. She then underwent a segmental small bowel resection with adjacent mesentery and side-to-side functional end-to-end anastomosis. Pathology of the resected specimen showed a perforated small bowel diverticulum with a 2.7 x 2.5 cm gastrointestinal stromal tumor (GIST). Most of gastrointestinal stromal tumors (GISTs) are asymptomatic and usually found incidentally during endoscopic or surgical procedures. When symptomatic, these tumors usually present with an upper or lower GI bleeding, abdominal pain, or obstructive symptoms. This case illustrates a rare presentation of a GIST as a perforated diverticular structure of small bowel.

A BUNDLE IN THE HEART: WOLFF-PARKINSON-WHITE SYNDROME PRESENTING AS CARDIAC ARREST

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Ventricular fibrillation (VF) is a rare complication of Wolff-Parkinson-White (WPW) Syndrome. We present a case of WPW presenting as VF arrest. A 21-year-old man with no past medical history was brought to emergency department after he experienced an out of hospital VF cardiac arrest after having a cold slushy. Patient achieved return of spontaneous circulation after 30 minutes of advanced cardiac life support. Patient was admitted to Intensive Care Unit for post cardiac arrest care which included targeted temperature management. During his hospitalization, elevated troponin and EKG changes in the inferior leads (II, III and aVF) prompted left heart catheterization. No evidence of coronary artery disease was found. Patient was successfully extubated with good neurological status after rewarming. On review of EKG patient was noted to have shortened PR interval and delta waves in the setting of normal sinus rhythm, thus fulfilling the criteria for WPW syndrome. The morphology of delta waves in the inferior leads was noted to be of pseudo-Q waves. Electrophysiology was consulted and patient underwent successful ablation of the left posterolateral accessory pathway. It was hypothesized that he had an acute vasovagal episode in response to the cold slushy, possibly inducing atrial fibrillation which lead to VF in the setting of WPW syndrome. VF accounts for many sudden cardiac deaths (SCD) in WPW syndrome. SCD is more common in patients symptomatic with WPW. Guidelines and treatment strategies need to be established to screen patients for WPW syndrome.

A CASE OF METHAMPHETAMINE TOXICITY IN A CHILD WITH PICA

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INTRODUCTION: Methamphetamine, a synthetic stimulant, acts on the central nervous system to increase monoamine levels and causes euphoria, wakefulness, and alertness for several hours. Pica is a feeding and eating disorder common in children between the ages of 2 and 3 and is characterized by the persistent consumption of nonfood substances. This case reports a pediatric incident of pica induced bowel obstruction with sepsis that was complicated by methamphetamine ingestion. Methamphetamine toxicity and bowel obstruction can present similarly in children; however, methamphetamine was not tested until the postmortem examination.

CASE DESCRIPTION: An 11 year old girl with a history of pica was found unresponsive in her home and pronounced dead after unsuccessful resuscitative efforts. Radiographic imaging showed multiple radio-opaque foreign objects in the stomach and bowel. Autopsy revealed foreign objects in her stomach and bowels: a green leafy substance, coins and other metallic items, folded papers, and plastics. Postmortem iliac blood and urine tested positive for methamphetamine and amphetamine.

DISCUSSION/CONCLUSION: This case emphasizes that the age range for suspected accidental drug ingestion should be expanded for those with pica, as these patients, despite being older, may not be able to differentiate between what they should and should not ingest. Furthermore, when treating a pediatric patient with pica that appears to present with bowel obstruction, unintentional drug ingestion should also be considered, particularly if there is a suspicion that the child lives in a household where drugs are abused, since drug toxicity presents similarly.

QUESTIONING THE VALIDITY OF PUBLISHED DATA ON PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY AS A BENCHMARK FOR INFRAINGUINAL ENDOVASCULAR PROCEDURES

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INTRODUCTION: Percutaneous transluminal angioplasty (PTA) of the infrainguinal arteries was the first endovascular technique for improving lower extremity circulation. It involves the inflation of a balloon-tipped catheter placed within stenotic or occluded vessels to improve perfusion and increase downstream blood flow. Subsequently, various other techniques, including subintimal angioplasty, stenting, or atherectomy alone or in combination, have been introduced to improve PTA results.

OBJECTIVE: New techniques are frequently compared to PTA as a benchmark, making valid PTA data essential for treatment development and outcome prediction. Our objective was to identify papers that have relevant data related to PTA and perform a thorough systematic review.

METHODS: We analyzed 976 papers published in peer reviewed journals within the Embase and PubMed databases to determine outcomes and effectiveness of PTA alone. The studies were chosen using a delineated search with inclusion and exclusion criteria. Inclusion parameters were defined as publication date after 2000, infrainguinal PTA procedures, one year of follow-up, and more than 50 patients evaluated. Exclusion criteria were defined as >10% of procedures using stent, atherectomy, or subintimal angioplasty. Additionally, reference lists of selected papers and key systematic reviews were perused.

RESULTS: In our review, we found only seven papers that contained pure PTA data, with an additional six studies that presented data from procedures utilizing only PTA ≥90% of the time.

CONCLUSION: There is a dearth of data related to the effectiveness of PTA without other interventions. Due to this, the comparison of other devices to PTA alone may not be valid.

CROSSBOW HOMICIDES: MORE COMMON THAN REPORTED?

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INTRODUCTION: Crossbow fatalities are a rare occurrence, with the manner of death more commonly being a suicide or an accident rather than a homicide.

CASE REPORT: A 20-year-old man was found dead in his driveway with a crossbow-bolt protruding from the upper left quadrant of his abdomen. On examination, the bolt had a mechanical two-blade broadhead that transected the descending aorta and lodged in the second lumbar vertebrae. Due to the injury to the descending aorta, 2100 milliliters of liquid and clotted blood were present within the peritoneal cavity.

DISCUSSION: For the forensic pathologist, entry wound reconstruction and radiology can be critical for determining if the weapon used to inflict a wound was a crossbow, a firearm, or a sharp object. This can be particularly challenging when the weapon is not found with the body and is complicated by the variety of tips that can be used for a crossbow bolt. The number of crossbow homicides may be underreported in the medical literature, as an internet search resulted in the discovery of fourteen crossbow homicide cases in the last five years compared to the eighteen total cases described in the medical literature. Underreporting could also be compounded by inconsistent manner of death determinations (homicide versus accident) in crossbow hunting-related deaths. Finally, the presented case, while highlighting the possible damage caused by a rarely used weapon, also sheds light on the problems inherent with the crossbow being straightforward to use, easily accessible, and potentially deadly.

RECOGNIZING LYME CARDITIS: A SLOW HEART NEEDING FAST DIAGNOSIS

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Only 3-4% of 30 000 cases of Lyme disease reported to the CDC each year involve Lyme Carditis; however, it remains one of the most common causes of acquired advanced AV block in otherwise healthy young or middle-aged adult patients[1]. Proper identification and treatment is essential to prevent progression of the disease into a fatal one. A case of a 39 year old male presenting to the Emergency Department with complaint of painful bilateral lower leg swelling and myalgias for two weeks highlights the importance of identification and treatment. This patient worked as a roofer, denied recent travel or tick bites, but admitted to IV methamphetamine use. His vitals were significant for bradycardia in the 30s. Initial EKG showed third degree heart block. Given the high degree of suspicion for infective endocarditis, TTE was ordered revealing a possible small vegetation on the aortic valve and possible abscess. Meanwhile, lyme serology was pending. Subsequently, a TEE ruled out both endocarditis and an abscess. At this point, Cardiac MRI was ordered to rule out sarcoidosis. The patient remained on empiric antibiotics throughout the hospital admission. Once preliminary lyme serology came back positive, antibiotic therapy was further tailored. The patient clinically improved over the course of several days and serial EKG's revealed improving heart block. Lyme carditis is a treatable disease. Prompt recognition and treatment can prevent disease progression, unnecessary placement of pacemakers, and death.

IDENTIFICATION OF RISK FACTORS FOR COMMUNITY-ACQUIRED CLOSTRIDIUM DIFFICILE

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BACKGROUND OR INTRODUCTION: Traditional risk factors observed in the hospital are not always seen in community-acquired Clostridium difficile.

OBJECTIVE OR PURPOSE: To determine patient population and risk factors for developing community-acquired Clostridium difficile and to see what population or factors tend to have the most reoccurrences.

METHODS: Data were requested for patients seen between January 2017- August 2018. Patients included were either diagnosed with community-acquired Clostridium difficile in the emergency department or within 72 hours of their hospital stay. Data were also requested for patients diagnosed with unspecified diarrhea during this time. Descriptive statistics will be utilized in 200 patients for both quantitative and qualitative data. (59)

RESULTS: Average age and weight for the Clostridium difficile patients is 57.15 years and 86.72 kg compared to 65.03 years and 82.92 kg. Both groups had 29/100 (29%) patients receive antibiotics prior to admission. 36/100(36%) of patients with Clostridium difficile were readmitted within 30 days versus 22/100(22%) of unspecified patients. Out of 100 patients with Clostridium difficile, 27 were on a PPI. This was less than the 33/100 patients in the control group. 31% of patients with Clostridium difficile had diabetes versus 26% in the control group.

DISCUSSION/CONCLUSION: Our sample showed similar results for patients receiving antibiotics prior to admission. Data also showed that, even though it was not the majority, there were some patients who had previous medical care, who were taking a proton pump inhibitor, or had diabetes. Pharmacists should be aware that other risk factors may still be present.

DOWNSTREAM MEDICATION DOSING ERRORS ASSOCIATED WITH THREE DIFFERENT METHODS TO OBTAIN WEIGHTS ON PREHOSPITAL PEDIATRIC PATIENTS.

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INTRODUCTION: Multiple studies have shown pediatric prehospital dosing errors occur at a high rate. The overall error rate, despite references that eliminate math, is 30%. The first step in accurate drug dosing is obtaining a weight. In the prehospital environment, this must be estimated since paramedics rarely have access to a scale. We sought to describe the methods used to obtain weight and their associated errors.

METHODS: As part of a quality improvement study, crews from 16 EMS agencies completed 4 validated, simulation scenarios: infant seizure, 8-month old burn, 5-year old anaphylactic shock and infant cardiac arrest. EMS crews used their regular equipment with sham drugs and were required to carry out all the steps to administer a drug dose. Two evaluators scored crew performance via direct observation and video review. A dose error was defined as >= 20% difference compared to the weight-appropriate dose. Descriptive statistics were utilized.

RESULTS: There were 137 simulations. Methods used to obtain weight were: asking the parent (AP) 17 (12.4%), length-based tape (LBT) 87 (63.5%) and age 32 (23.4%). The associated drug dosing error rates were: AP (1/17 5.8% 95% CI: -5.3%,16.9%), LBT (16/87 18.4%, 95% CI 10.3%-26.5%) and age (10/32 31.3%, 95% CI 15.23% to 47.37%).

CONCLUSION: Asking the parent for a weight was associated with the lowest downstream drug dosing error rate. Using a weight determination hierarchy with asking the parent for a weight first should be considered in order to decrease prehospital pediatric medication dosing errors.

PATIENTS' OPINION REGARDING LENGTH OF STAY FOR CYSTIC FIBROSIS (CF) PULMONARY EXACERBATIONS AT A SINGLE CF CENTER

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INTRODUCTION: Intravenous (IV) antibiotics and intensified pulmonary clearance are the mainstay treatment for inpatient CF exacerbations. In 2015, our 4-day LOS was lower than the 10-day national average. Percent of treatment completed while inpatient (49%) and median FEV1 predicted (80.7%) were lower than the national 82.2% and 92.9% respectively.

OBJECTIVE: Our April 2017-2018 survey evaluated opinions regarding LOS to help identify improvement opportunities, with IRB exemption.

METHODS: Families received surveys during visits, and responses recorded in REDCap. Survey included demographics, number of hospitalizations, age, Likert-type items assessing perceptions on hospital LOS. Likert-type items were as follows: 1="Strongly Disagree", 2="Agree", 3="Neither agree nor disagree", 4="Agree", 5="Strongly agree". Frequency of responses and mean were calculated.

RESULTS: 19/35 families completed the survey. Most agreed that patients should remain hospitalized for most of the 14-day IV antibiotics course due to closer monitoring, prompt therapy adjustments and better outcomes. The negative associations with increased LOS: perceived increased infection exposure and decreased school performance. Most disagreed that hospitalizations decrease the stress of managing CFE and timeliness of treatments.

CONCLUSIONS: We wanted to identify intervention opportunities to improve perception of increased LOS. Although most patients agreed that longer stays result in improved outcomes, they worried about infection exposure and decreased school performance. Most disagreed that longer LOS leads to timelier therapy delivery and decreased stress. Next steps: working with staff to ensure timely treatments, patient education about infection control measures and minimization interruptions in school. In 2016, our already center showed improvement in those measures, reflecting changes.

LAPAROSCOPIC REPAIR OF INCARCERATED MORGAGNI HERNIA

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OBJECTIVE: To demonstrate a successful laparoscopic transabdominal mesh repair of an incarcerated Morgagni hernia.

INTRODUCTION: An incarcerated Morgagni hernia, the rarest of congenital diaphragmatic hernias, occurs when abdominal viscera herniate through an anterior defect in the diaphragm. Surgical repair of the hernia is recommended to relieve symptoms and prevent strangulation. Here we present a case of laparoscopic surgical repair of a Morgagni hernia using mesh in an obese patient.

METHODS: A 34-year-old morbidly obese female presented with 18 months of intermittent epigastric and chest pain, along with dyspnea, that worsened after eating and before bowel movements. Laboratory work-up was unremarkable. CT imaging revealed an incarcerated Morgagni hernia containing omentum and transverse colon.

PROCEDURE: A laparoscopic repair was subsequently performed with port placement in the RUQ, LUQ, and supraumbilical regions. The hernia sac and its contents were carefully reduced using both sharp and blunt dissection. Due to chronicity and location, the hernia sac was not excised. After clearing the hernia defect of adhesions, it was closed primarily under minimal tension using multiple transfascial-to-hernia defect sutures placed in a U-shaped manner. The repair was reinforced with polypropylene mesh which was secured to the abdominal wall and diaphragm using laparoscopic tacks.

RESULTS: The patient did well post-operatively. She continued to do well both clinically and radiographically at one-year follow-up.

CONCLUSION: An incarcerated Morgagni hernia can be repaired safely and successfully in obese patients using a transabdominal laparoscopic approach with mesh.

CHARACTERIZING UROLOGIC DYSFUNCTION IN MALE PATIENTS WITH LUMBAR DISC DISEASE

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INTRODUCTION: Lumbar-sacral herniated discs are one of the most common causes of neurogenic related urologic dysfunction. This is because the nerve roots supplying the bladder and reproductive organs originate at the end of the spinal cord, termed the cauda equina. Therefore, most urologic dysfunction is related to either voiding or sexual dysfunction. Reported rates of urologic symptoms in patients with lumbar disc disease are as high as 74%. Here, we hope to further describe the etiology (neurogenic vs non-neurogenic) of urologic dysfunction in patients with documented lumbar disc disease.

METHODS: A list of worker's compensation patients with documented lumbar disc disease who presented to one urologist (EA) for urologic evaluation between 2004-2014 was generated. Records were reviewed for completion and data was manually extracted. Male patients were the first subset to be extracted. Data points related to: demographics, presenting symptoms, past medical history, imaging studies, physical exam findings, urologic diagnostic tests, and diagnoses were obtained. Diagnoses such as: urinary incontinence (urge, stress, mixed), overactive bladder, neurogenic bladder, and benign prostatic hypertrophy, were considered voiding dysfunction. Erectile dysfunction and hypogonadism were considered diagnoses of sexual dysfunction.

RESULTS: Preliminary results show 113 male patients with a history of lumbar disc disease and urologic dysfunction. 55 were diagnosed with sexual dysfunction only, 11 were diagnosed with voiding dysfunction only; and 47 were diagnosed with both sexual and voiding dysfunctions. By elucidating the etiology of urologic dysfunction, we hope to add to the literature regarding urologic dysfunction and lumbar disc disease.

ASPIRATION AND ARDS AFTER REPAIR OF A KETOROLAC-INDUCED ULCER

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INTRODUCTION: Aspiration is a risk for any patient undergoing anesthesia. Careful preoperative assessment can mitigate the risks of surgery, but is not always available, especially in emergent cases. We present the case of an 80-year-old man who, during attempted surgical repair of a perforated duodenal ulcer, aspirated and developed ARDS.

CASE REPORT: An 80-year-old man presented to the ED with renal colic secondary to nephrolithiasis, was prescribed ketorolac, and discharged. He underwent cystoscopic stone removal two weeks later. One week later, he suffered a perforated duodenal ulcer, and at that time, admitted to having continually taking ketorolac since his initial visit. During subsequent surgical repair, he aspirated and developed acute respiratory distress syndrome. Soon after, he became bradycardic and died. Autopsy revealed diffuse alveolar damage consistent with ARDS. Cause of death was ruled, "complications of general anesthesia... occurring after extended ketorolac use for renal colic."

DISCUSSION: Ketorolac is a potent but highly gastrotoxic analgesic often used for renal colic. It modulates gastric secretions and adverse effects include inflammation and mucosal erosions. In our case, improper and prolonged use led to ulcer formation and perforation. Care must be taken to ensure appropriate use, especially in high-risk individuals. Aspiration is a rare but catastrophic complication that can result in pneumonia and pneumonitis. Prevention occurs with thorough preoperative assessment. Severe cases can lead to ARDS, which is progressive respiratory failure secondary to pulmonary edema. Treatment is aimed at reducing inflammation and fluid accumulation; however, ARDS may be lethal, as our case demonstrates.

VENTRICULOPERITONEAL SHUNT OCCLUSION RESULTING IN ACUTE HYDROCEPHALUS AND DEATH IN DEVELOPMENTALLY-DELAYED PATIENTS: 2 CASE REPORTS

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The standard clinical strategy for managing conditions with chronic hydrocephalus involves the placement of a ventriculoperitoneal (VP) shunt. Failure of the shunt due to physical obstruction of the device is a recognized complication; however, the mortality associated with obstruction is poorly-defined. In this report, the authors describe two cases of death related to acute hydrocephalus resulting from obstruction of VP shunts.

CASE 1: A 23-year-old female cerebral palsy patient with a history of congenital hydrocephalus and VP shunt was found unresponsive and apneic at her group home, just three days after being hospitalized for "gastroenteritis." Despite initial successful resuscitation, she was pronounced braindead shortly after admission. Autopsy disclosed signs of acute hydrocephalus. Evaluation of the VP shunt revealed occlusion by soft, red-tan substance, which, on microscopic exam, was composed of fibrovascular tissue with chronic inflammatory cells.

CASE 2: A 15-year-old cerebral palsy patient, with a history of hydrocephalus with VP shunt, presented to an emergency department (ED) with complaints of progressively worsening headache and neck pain. Upon arrival at the ED, he experienced a seizure and became unresponsive. He was resuscitated, and despite urgent intervention, he died the next day. Autopsy revealed signs of acute hydrocephalus and a complete VP shunt obstruction.

Although VP shunt failure is relatively common, death related to such failure is relatively rare, or at least not well-described in the literature. The presented cases serve to highlight the importance of shunt evaluation at autopsy in cases of sudden, unexpected death in this vulnerable patient population.

DEATH FROM PHEOCHROMOCYTOMA INITIALLY SUSPECTED OF BEING A HOMICIDE

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INTRODUCTION: Homicides require a great deal of time, effort, and resources from police and forensic professionals. Occasional cases occur wherein initial evaluation suggests that a homicide has occurred, but after autopsy, the death is actually determined to be the result of natural disease.

PURPOSE: We present a case of adrenal pheochromocytoma initially presenting as a suspected homicide.

MATERIALS: This case is selected from the files of one of the authors (JP).

RESULTS: A 66-year-old male was found dead in his residence, with a pool of blood surrounding his head, which had evidence of trauma. The case was initially considered suspicious for homicide. Upon further investigation, however, most of the head injuries appeared to be consistent with postmortem rodent feeding, with no lethal injuries identified. Autopsy revealed a 7 cm, mostly solid mass in the right adrenal medulla, as well as a markedly-enlarged heart (750g), with coronary artery atherosclerosis, and kidney findings consistent with hypertension. Microscopic analysis of the adrenal tumor confirmed the diagnosis of pheochromocytoma. The cause of death was certified as being due to hypertensive and atherosclerotic cardiovascular disease, with a contributing factor of an underlying pheochromocytoma.

DISCUSSION/CONCLUSION: Pheochromocytomas have varied clinical manifestations and represent a situation in which surgical tumor resection may be curative of hypertension. This case highlights the importance of clinical screening for uncommon etiologies of hypertension. The case also demonstrates that cause of death determination can be complicated by factors such as postmortem animal activity, accidental trauma, and rare diseases.

REPAIR OF A GIANT INGUINAL HERNIA

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INTRODUCTION: A giant inguinal hernia is defined as a hernia that extends beyond the midpoint of the inner thigh when in a standing position. It is more uncommon than other inguinal hernias and is difficult to treat surgically.

CASE DESCRIPTION: A 76-year old gentleman presented with a giant right inguinal hernia. Over the last 20 years, the hernia had progressively increased in size and adversely affected his quality of life leading to: loss of the normal micturition mechanism requiring self-catheterization; back pain, postural change and perturbation to his stance with shifting the center of body mass due to progressively increasing weight of the scrotum; and mechanically-limited ambulation. On examination, the patient had a scaphoid abdomen with a giant, non-reducible right inguinoscrotal hernia extending down to the level of his knees. He was hospitalized for a small bowel obstruction within his hernia as seen on a CT scan and was managed non-operatively. After a pre-operative medical optimization, a partial omentectomy and mesh repair were performed. The patient was discharged home on POD#3. He developed early satiety that improved over two weeks. At five months follow-up, the patient is doing well with pain resolved. He is tolerating a general diet and has an improved quality of life.

CONCLUSIONS: Giant inguinal hernias are challenging to manage surgically. This case discusses a successful operation that has demonstrated a favorable outcome at five months following the repair.

NEUROLOGIC ACYCLOVIR TOXICITY DESPITE NORMAL RENAL FUNCTION

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INTRODUCTION: Acyclovir is an antiviral medication commonly prescribed for herpes simplex virus, cytomegalovirus, and varicella zoster virus (which manifests as chickenpox and shingles). The drug acts as a nucleotide analog and inhibits viral replication. In the U.S., 1 million cases of shingles are reported every year and result in nearly one billion dollars in health care expenses annually. Due to the prevalence of acyclovir use, physicians should be aware of the potential for neurotoxicity, which while rare, is typically diagnosed in patients who have chronic kidney disease or acute kidney injury.

CASE HISTORY: We report a case of neurotoxicity in a 63 year-old male patient with normal renal function. The fatigued patient presented with altered mental status as well as neurological manifestations including global ataxia and aphasia. The lack of abnormal imaging studies and lumbar puncture cerebral spinal fluid analysis raised suspicion of antiviral toxicity. Subsequent clinical improvement following withdrawal of the antiviral led to the conclusion of acyclovir induced encephalopathy.

DISCUSSION: In patients taking acyclovir, common causes of neurological impairment include viral encephalitis, meningitis, ischemic stroke or acyclovir toxicity. Acyclovir is a renally excreted compound. Thus, in patients with impaired renal function, toxicity may develop. For patients with normal renal function toxicity may be attributed to decreased muscle mass, insufficient fluid intake or overdose. As the incidence of viral diseases treated with acyclovir increases, atypical neurotoxic reactions should be considered even for patients with normal renal function, as early detection will prevent sustained neurologic impairment.

NON- ST ELEVATION MYOCARDIAL INFARCTION OR A MISSED DIAGNOSIS OF PULMONARY EMBOLISM: A CASE OF CARDIAC ARREST SECONDARY TO ACUTE PULMONARY EMBOLISM IN A WOMAN PRESENTING WITH TYPICAL ANGINA PAIN

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A 52-year-old woman with past medical history of type 2 diabetes mellitus, hypertension and chronic obstructive pulmonary disease presented with complaints of central chest tightness/heaviness with radiation to the left shoulder. Electrocardiogram (ECG) showed T wave inversion in leads V1 and V2 and troponin level was raised at 0.2 micrograms/litre. A diagnosis of NSTEMI (non-ST elevated myocardial infarction) was made and she was started on appropriate treatment. The next day she had an in-patient coronary angiogram which showed no evidence of obstructive coronary artery disease and patient was thought to have coronary microvascular disease. Heparin drip was stopped and patient was continued on aspirin, statin and advised on strict glycemic control. She remained completely asymptomatic. However, the next day she coded. She was found down and unresponsive. CPR was initiated and return of spontaneous circulation was achieved after one round of compressions. She was neurologically intact post-arrest. Further workup revealed a new complete right bundle branch block and S1Q3T3 pattern on ECG. D-dimer was elevated at 6000 and lower extremity venous ultrasound showed chronic deep venous thromboses (DVT) in the left distal femoral and popliteal veins. Echocardiogram showed an ejection fraction of 45%, severely dilated left ventricle and systolic flattening of ventricular septum. On V/Q scan there was intermediate probability of PE however cardiac MRI showed filling defects consistent with thrombi in the right and left pulmonary arteries. Patient was continued on heparin and eventually transitioned to novel oral anticoagulant (NOAC).

FIND A PRIMARY CARE PHYSICIAN (PCP)! : CASE OF A SELF-TREATING PHYSICIAN

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Self-prescribing is commonplace; studies in US and Canada have shown that more than half of the physicians had self-prescribed at one point in their career. We present an 80-year-old family physician who was tachycardic with an irregular pulse at home and thus self-diagnosed himself with Atrial Fibrillation (AF). He tried to treat himself with oral Diltiazem but ended up over treating; becoming dizzy and bradycardic to a pulse of 40 and thus coming to the hospital. This was not an isolated event as patient never found a Primary Care Physican (PCP) for himself and had had an extensive history of self-prescribing since he was a medical resident. Being an avid basketball player, patient was hampered by Achilles tendinitis. He started taking oral prednisone and giving himself subacromial corticosteroid injections. Patient eventually developed Addison's disease and had an episode of him partially rupturing his Achilles tendon due to the injection. He had also tried to suture a skin laceration on his leg in the past, resulting in a wound infection. Therein, he prescribed antibiotics for himself too!
Physicians in general tend to not sign up with a PCP and choose to ignore their own health concerns. This is especially pertinent to residents who are moving to new places in the country. The grueling demands and working hours of residency put them off the idea of signing up with a PCP. Thus, residency programs need to play an active part in encouraging residents to visit a doctor in their limited free time.

THE FORGOTTEN DISEASE: AN ATYPICAL CASE OF LEMIERRE'S SYNDROME PRESENTING AS A SHOULDER ABSCESS

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Lemierre's Syndrome is an acute oropharyngeal infection with secondary septic thrombophlebitis of the internal jugular vein and distant septic emboli. It is a rare and potentially fatal disease.

A 29-year-old female presented to an urgent care with sore throat, shortness of breath and left shoulder pain. She was prescribed antibiotics for pneumonia. Four days later she presented to emergency department with worsening symptoms. She was tachycardic, tachypneic and hypoxic. Initial laboratory findings included profound neutrophilic leukocytosis. Computed topography of neck and chest revealed multiple loculated abscesses on deep left shoulder and retro-clavicular soft tissue, right peritonsillar abscess, thrombosis of a branch of right external jugular vein and multiple bilateral septic emboli to lungs. She was started on Clindamycin and Ampicillin-Sulbactam. She developed septic shock and required intubation due to respiratory failure. She underwent drainage of left shoulder abscess and tissue culture grew Fusobacterium. After two weeks of complicated intensive care unit stay, patient was transferred to medicine floor after improvement of hemodynamic and respiratory status.

Lemierre's Syndrome usually involves internal jugular vein, but rarely involves external jugular vein or its branches. Furthermore, septic emboli to lungs are common but soft tissue abscess of shoulder is very rare. Shoulder abscess was the unusual complication in our patient and was also the reason the patient decided to seek medical care initially. Regardless of the presentation, it is potentially a fatal disease requiring prompt diagnosis and management. An un-resolving sore throat in appropriate clinic setting should prompt the physician to consider Lemierre's Syndrome.

CHYLOTHORAX IN A PATIENT WITH A PERIPHERALLY INSERTED CENTRAL CATHETER AND MULTIPLE PRO-THROMBOTIC RISK FACTORS

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INTRODUCTION: Chylothorax, caused by leakage of intestinal lymphatic fluid into the pleural cavity, is a known complication of thoracic surgery. Another cause, though rare, is upper extremity deep vein thrombosis (DVT). Peripherally inserted central catheters (PICC) significantly increase the risk of thrombotic events. Extreme caution should be taken when used in patients with pro-thrombotic risk factors.

CASE HISTORY: A 24-year-old female status post-hysterotomy for HELLP syndrome with post-operative fever, had a PICC placed in her right upper extremity for long-term intravenous antibiotics. The patient had a history of DVTs and repeated pre-eclampsia. Following PICC placement, she developed a PICC-associated right upper extremity DVT and bilateral exudative pleural effusion. The PICC was removed and she was discharged on anticoagulation therapy. Two weeks later, she developed a new left jugular and subclavian DVT secondary to subtherapeutic anticoagulation. Chest imaging revealed right pleural effusion. A thoracentesis drained 600 mL of cloudy, yellow fluid, and analysis confirmed the presence of a chylous effusion.

DISCUSSION: Our patient presented with multiple risk factors for DVT that were likely exacerbated by the insertion of a PICC, leading to subsequent chylothorax. Although the use of a PICC has benefits over other vascular devices for delivery of intravenous medication, the risks need to be carefully considered for a patient that exhibits an increased predisposition to DVT.

DOES PANCREATIC ENZYME DOSE CORRELATE WITH IMPROVEMENT OF VITAMIN D LEVELS {25(OH)D}, IN CYSTIC FIBROSIS (CF) PATIENTS?

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INTRODUCTION: CF causes pancreatic insufficiency (PI) and lipid-soluble vitamins deficiency. In patients with low 25(OH)D, we hypothesize that pancreatic enzymes supplements (PERT) are not sufficient. We anticipate that correct dose of PERT will improve subsequent 25(OH)D in PI patients.

OBJECTIVES: To assess whether PI status and enzymes dose correlates with 25(OH)D in CF, if MedPack affects 25(OH)D.

METHODS: A QI initiative successfully reduced the incidence of 25(OH)D deficiency in the CF patients treated WMed CF Clinics. A retrospective study was conducted to analyse how PERT dose and other factors was related to 25(OH)D. Statistical analyses were completed using SAS v9.4.

RESULTS: Average 25(OH)D was 32.32(95% CI: 29.05, 35.59) for PI vs. 42.86(95% CI: 37.49, 48.22) for PS (P:0.0018). Patient with PI had a weekly VID dose at 41,474(95% CI: 32,631, 50,316) vs. 5,461, 32,915)(P:0.0065)for PS patients. The 25(OH)D for patients on a MedPack was higher 40.71(95% CI: 36.15, 45.27), vs was 33.49(95% CI: 30.18, 36.79)(<0.0001). No statistically significant relationship between vitamin D level and enzyme dose was found.

CONCLUSION: PI status is significantly related to both vitamin D level and vitamin D dose, However, Enzyme dose was significantly related to vitamin D level. MedPack was significantly related to vitamin D level.

UNUSUAL SUICIDE USING TWO FIREARMS

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600,000 persons committed suicide in the United States from 1999-2015, with the highest annual rate in 20151. In 2016, 52% of suicides involved firearms.

We present a case of a man who committed suicide by simultaneously holding two handguns against opposite sides of his head.

The case was selected from the files of one of the authors (AC).

A 42-year-old man was found prone on the floor with a semi-automatic handgun in his right hand and a revolver in his left hand. At autopsy, a contact gunshot wound was identified on his left temple, with a bullet track passing through the brain and creating a partial exit wound complex on the right temple, which was associated with a muzzle-imprint abrasion consistent with having been produced by the semi-automatic pistol. Firearm examination revealed that the revolver was the only weapon that discharged. The cause of death was a gunshot wound of the head.

In most cases of firearm suicides, the findings are relatively straight-forward: Bullet trajectory is not ambiguous, only a single shot is fired, and only a single weapon is used. This case highlights the fact that, in occasional cases of suicidal gunshot wounds, multiple weapons are employed. Additionally, the case represents an unusual circumstance where, despite the presence of two weapons and the appearance of two contact wounds, only one of the firearms discharged.

Although unusual findings in suicidal gunshot wounds can cause confusion, correlating scene, autopsy, and firearms examination findings allow for proper interpretation and certification.

HEART RATE VARIABILITY AND MILD TRAUMATIC BRAIN INJURY: CASE STUDY AND REVIEW OF LITERATURE

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Sports-related mild traumatic brain injury (MTBI) is estimated to affect 3.8 million people in the United States. Identifying quantitative measures of recovery has become a point of interest in treatment. Heart Rate Variability (HRV), the average fluctuation in the interval between heartbeats, shows promise as a noninvasive biomarker.

A 15-year-old Caucasian male cross-country runner hit the back of his head during a soccer game suffering an MTBI. The patient rested from activity for 1 week then returned to training. Two months after the injury the patient complained of persistent shortness of breath, fatigue, and increased heart rate while running. His average BPM while running prior to the injury was in the 160s and has since jumped to the 180s. The patient was monitored, and training was adjusted to avoid symptoms. Patient's condition improved gradually with return to baseline activity in 4 months.

Current MTBI treatment guidelines depend on the presentation of the injury, however, return to play guidelines for athletes remain dependent on self-reported symptoms. In this case, symptoms correlated with HRV and persisted for 4 months post-concussion. Returning an athlete to play prematurely may prolong the recovery process and cause symptoms to re-emerge. There is limited evidence demonstrating a diminished HRV during exercise exists in athletes recovering from MTBI compared to controls. HRV may also be a useful marker for recovering athletes to manage their symptoms during recovery.

HRV is a promising point of investigation for management of post-concussive symptoms. Further research is necessary to elucidate the effects.

LOPERAMIDE ABUSE AND ITS SEQUELAE

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INTRODUCTION: Loperamide is an opioid available over the counter and in prescription form. Loperamide functions as a μ-agonist within the enteric nervous system to slow intestinal motility. Its anti-diarrheal properties and primarily peripheral activity make loperamide an important tool in the management of gastrointestinal symptoms associated with inflammatory bowel disease. In this case we present a patient whose large consumption of loperamide, intended to alleviate the severe symptoms of his advanced Crohn's Disease, resulted in death.

CASE HISTORY: A 42-year-old male was found unconscious in cardiac arrest, and Emergency Medical Personnel restored normal sinus rhythm at the scene. Family reported complaints of intense abdominal pain earlier that day and that he 'went through a lot' of loperamide. In the Emergency Department, he was still unresponsive and exhibited symptoms mirroring an opioid overdose. His mental status improved after the administration of Naloxone, an opioid antagonist. An electrocardiogram revealed a prolonged QTc interval which progressed into a precarious Torsades de Pointes rhythm. The patient succumbed from sustained hypotension and hypoxic brain injury. At autopsy, there was evidence of acute pancreatitis. Loperamide and significantly elevated desmethylloperamide (loperamide metabolite) was detected in blood samples. Cause of death was ruled the toxic effects of loperamide.

DISCUSSION: Due to the lack of central nervous system activity and associated euphoria at therapeutic doses, loperamide abuse is rarely reported. This case is an important example that an overdose on loperamide can occur in patients seeking symptom alleviation, and may mimic the presentation of traditional opioid overdose. Can cause confusion, correlating scene, autopsy, and firearms examination findings allow for proper interpretation and certification.

TO TREAT OR NOT TO TREAT: PREDNISONE TREATMENT OF MINIMAL CHANGE DISEASE IN A PATIENT WITH CHRONIC HBV

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INTRODUCTION: Minimal change disease (MCD) accounts for 10-15% of cases in adult nephrotic syndrome. Clinical presentation is characterized by marked proteinuria, hypoalbuminemia, and hyperlipidemia. The mainstay initial therapy is prednisone or prednisolone.

CASE DESCRIPTION: A 61-year-old female presented with acute hepatitis, transaminitis, hyperbilirubinemia, and hypoalbuminemia. Ultrasound of the liver with doppler revealed coarse nodular echotexture suggesting cirrhosis.

Five months prior, the patient was diagnosed with nephrotic syndrome. Her laboratory tests revealed marked proteinuria, diffuse edema, hypoalbuminemia, and hypercholesterolemia.. Renal biopsy demonstrated MCD and acute tubular necrosis. Hepatitis panel revealed positive HbsAg, HbcAb, and HbeAb, while HbcAb IgM and Hep C Ag were negative, suggesting chronic HepB infection. Diagnosis of chronic HepB was confirmed with HBV PCR DNA levels at 530 IU/mL. She was discharged on 80 mg daily prednisone and placed on dialysis three times a week for two months. Prednisone was tapered after four months of treatment; improved renal function allowed for discontinuation of dialysis.

During her present hospital course when she presented with hepatic failure, workup for hepatitis B reactivation showed HBV DNA levels had increased to 14.4 million IU/mL. Therapy with oral entecavir was initiated. The patient's hepatic function improved; liver enzymes consistently trended downward. At follow up visit, both renal and hepatic function remained stable.

DISCUSSION: While prednisone is the leading therapy for nephrotic syndrome secondary to minimal change disease in adults, this case highlights the importance of antiviral prophylaxis in patients with concurrent chronic hepatitis B infection.

HOLOPROSENCEPHALY

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INTRODUCTION: Holoprosencephaly is a congenital malformation defined by partial or complete separation of the prosencephalon. A spectrum of mental and physical deficits can induce familial hardship, leaving patients vulnerable to potential abuse.1

PURPOSE: We present the case of a child with holoprosencephaly found deceased in her bed.

MATERIALS: The case is selected from the files of one of the authors (JP).

RESULTS: A 3-year-old female with frontal lobar holoprosencephaly causing severe mental and physical disabilities was found deceased in a bed cluttered with pillows, with one lying over her face. The decedent had a history of diabetes insipidus, repaired cleft lip, and cleft palate. Prior to death, she had experienced breathing abnormalities. At autopsy, there were no injuries. Brain exam revealed a discontinuous connection between the frontal lobes which extended into the anterior aspect of the normal location of the septum pellucidum, which was absent. The olfactory bulbs/tracts were also absent. Microscopically, there was moderate to severe bronchiolitis/bronchitis. Subsequent investigation failed to reveal any indication of accidental or intentional asphyxia. The cause of death was bronchiolitis/bronchitis with underlying partial holoprosencephaly.

DISCUSSION: Holoprosencephaly is often diagnosed by fetal imaging confirming incomplete cleavage of the prosencephalon. Holoprosencephaly results in severe developmental deficits, as well as a spectrum of craniofacial abnormalities, feeding difficulties, endocrine disorders, and autonomic nervous system dysfunction.2 Holoprosencephaly has long-term familial and financial implications1, contributing to the risk of abuse.

CONCLUSION: Although concerns for possible abuse in this case were unwarranted, the case serves to educate clinicians about holoprosencephaly.

HYPOTHERMIA DEATHS AND ALTERED MENTAL STATUS

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INTRODUCTION: The Midwestern United States is no stranger to sub-freezing winters. But while most people who have access to shelter would be apt to escape the cold to find solace inside, some who are cognitively impaired may find themselves unable to illicit this natural instinct. 5

PURPOSE: We report on nine hypothermia-related deaths wherein some form of altered mental status contributed to death.

MATERIALS: Cases were non-randomly selected from the forensic pathology files of one of the authors (JP).

RESULTS: Nine cases of death from hypothermia are presented. Based on review of the scene investigation, autopsy results, and previous medical records, each case involved some form of impaired judgment, including dementia, physiologic hormone or electrolyte imbalance, or drug use or abuse.2,3,5 While the situations for each case differed, classic morphologic stigmata of hypothermia, including gastric Wishnewsky spots and "frost erythema" were seen in a majority of cases.7 Paradoxical undressing was also common.7

DISCUSSION: Although not the only risk factor, altered mental status is a well-known risk factor for hypothermia. Common causes of altered mental status include degenerative neurologic disorders, including various forms of dementia, as well as substance abuse.2,3,5 It should also be noted that alcohol abuse and degenerative neurologic disorders frequently have coexisting physical manifestations; such comorbidities may have also played a contributory role in these deaths.

CONCLUSION: By highlighting the inherent risks of hypothermia related to altered mental status, preventive strategies may be developed and implemented in order to reduce the mortality within specific populations. 1, 2, 3

IMPORTANCE AND APPROACH TO MANNER OF DEATH DETERMINATIONS IN OPIOID-RELATED DEATHS

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INTRODUCTION: Accurate opining of manner of death by the forensic pathologist in cases of opioid overdoses is important for the families of the decedents and for public health purposes. While the majority of opioid deaths are accidental, suicide opioid deaths are likely under reported. This results in skewed vital statistics, preventing an accurate understanding of the opioid epidemic and impairing public health intervention.

CASE HISTORY: A 33 year-old male died of a heroin overdose. The manner of death likely would have been deemed accidental if not for strong evidence of suicide that emerged late in the investigation through dialogue between the forensic pathologist and the decedent's family. This evidence included text messages sent by the decedent shortly before his death that revealed his suicidal ideations and intentions.

DISCUSSION: This case highlights the importance of an engaged relationship between the medical examiner office and the decedent's family. A cooperative relationship can empower the family to participate in the investigation, which may provide useful information. Determining the manner of death in opioid deaths can be challenging, especially differentiating between accident and suicide. The cultural, religious, and legal implications of suicide further complicate this process. However, efforts must be made to reach accurate opinions, especially because manner of death data helps to inform the physicians, policy-makers, and others that are working to prevent opioid-related morbidity and mortality. A checklist of key investigative information and procedures is provided to assist the forensic pathologist when investigating potentially difficult manner of death determinations in opioid deaths.

TRAPPED BEHIND THE LOOKING GLASS: A CASE OF HALLUCINOGENIC PERSISTING PERCEPTION DISORDER WITH RESPONSE TO PRAZOSIN

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Hallucinogens have made a comeback, both recreationally and in the medical field. Discussions of microdosing LSD for depression or ayahuasca for addiction seem unavoidable in the mainstream. Recreationally, hallucinogens have been used by 15% of Americans in their lifetime (SAMSA) and by 1.9% of the population within the last year. Many users cite hallucinogens as being a powerful tool for expansion of the mind and spirit. However, with any substance there are risks and potential side effects. Familiar to many under the propagandized term "flashbacks", hallucinogen persisting perception disorder (HPPD) is a rarely encountered DSM5 diagnosis that can cause significant impairment and distress in hallucinogen users. As the name indicates, patients who suffer from HPPD have enduring perceptual disturbances long after they are no longer under the influence of a hallucinogen. Literature on HPPD is sparse, and no definitive treatment exists. What follows is a review of HPPD and a case report of a young man who ingested a large amount of lysergic acid diethylamide (LSD) over the course of two months and developed persistent changes in both vision and hearing. The most distressing symptom being the appearance of "the walls breathing" almost constantly, every day. The patient was diagnosed with PTSD and treated with prazosin for nightmares and somatic symptoms of anxiety unrelated to his drug use, incidentally reporting dissipation of the perceptual disturbances. This appears to be a novel use of prazosin; however further research is necessary.

USING A SPRING-LOADED SILO TO FACILITATE IMMEDIATE BOWEL REDUCTION FOR SUTURELESS CLOSURE IN GASTROSCHISIS

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BACKGROUND: "Sutureless" closure of gastroschisis involves the manual reduction of bowel and covering the defect with umbilical cord. If manual reduction is difficult, we propose using a spring-loaded silo to facilitate immediate bowel reduction.

METHODS: Retrospective data was collected on gastroschisis infants who underwent immediate bowel reduction using a spring-loaded silo and sutureless closure by one surgeon at one institution from May 2015 to September 2018. Bowel is placed into a silo and the base beneath fascia. Bowel is completely reduced, and silo removed. Skin edges are brought together with adhesive strips.

RESULTS: In six infants (four female, two male), median gestational age [SD; range] and median birthweight [SD; range] were 35.4 [0.65; 34.7-36.6] weeks and 2.22 [0.39; 1.82-2.76] kg, respectively. Five had 3.0 cm fascial defects. One had a 4.0 cm defect. Median procedure duration [SD; range] was 30 [6.57; 24-42] minutes. Median times to first and full enteral feeding [SD; range] were 13.5 [4.26; 6-17] and 25 [10.06; 20-47] days, respectively. Five required intubation, one post-delivery, and four after bowel reduction. Median duration of intubation [SD; range] was 2 [1.30; 1-4] days. Median duration of hospital stay [SD; range] was 31 [17.18; 25-72] days. Median duration of follow-up [SD; range] was 15.7 [7.60; 0.9-23.3] months. One infant's fascial defect closed, three had a 3 mm residual defect, and two underwent umbilical herniorrhaphy for larger defects (1.5 cm and 4 cm).

CONCLUSION: A spring-loaded silo is a helpful adjunct for immediate bowel reduction to facilitate sutureless closure for gastroschisis.

ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER (ADHD) AND PSYCHOTROPIC POLYPHARMACY TRENDS IN CHILDREN AND YOUNG ADULTS

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Diagnoses of ADHD and usage of ADHD medications have increased in recent years among children and young adults. Concomitant psychotropic use in youth has also risen, despite a lack of safety and efficacy studies to support these trends. This study was designed to: (1) assess annual rates of ADHD medication prescribing and the frequency of psychotherapeutic polypharmacy among patients 2-24 years old with ADHD in the United States; (2) identify the most commonly prescribed ADHD medications and concomitantly prescribed psychotropics; and (3) assess if patient and provider characteristics are associated with an increased risk of ADHD or psychotropic polypharmacy. The dataset for the study was obtained from the National Ambulatory Medical Care Survey (NAMCS) for the period 2006-2015 and National Hospital Ambulatory Medical Care Survey (NHAMCS) databases for the period 2006-2011. The study sample included visits of patients who were 2 to 24 years of age and prescribed one or more ADHD medications. The rate of ADHD medication prescribing in children and young adults has significantly increased from 2006 to 2015, along with an increasing prevalence of ADHD polypharmacy. Concomitant psychotropic polypharmacy has similarly increased, creating cause for concern with only limited data supporting safety and efficacy in these patients. Factors such as age, sex, payer source, year, and receipt of mental health services were significantly associated with ADHD or psychotropic polypharmacy. These trends in increased medication use and their association with specific visit-level characteristics emphasize the need to examine the impact of health care providers on ADHD decision making.

LIGATURE STRANGULATION USING CABLE TIES: 5 CASES

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INTRODUCTION: Asphyxial deaths are related to decreased oxygen delivery to tissues. Such deaths can result from neck airway or blood vessel compression. Ligature strangulation involves neck compression by a ligature wherein the decedent's body weight does not contribute to the compressive force.

PURPOSE: This report describes 5 deaths in which plastic cable ties were secured around the neck for the purposes of producing ligature strangulation.

RESULTS: Cases 1 and 2 were the victims of a double homicide. The adolescent male victims were killed by an adult family friend who subsequently killed himself by hanging. Case 3 was an alcoholic man who was found dead in his home with two cable ties bound securely around his neck. Cases 4 and 5 were the victims in a homicide-suicide scenario in which a 46-year-old man killed himself and his 6-year-old son within the compartment of an automobile, using multiple volatile hydrocarbons, including gasoline. They were both found decomposing, with cable-ties loosely secured around both of their necks. Presumably, the cable-ties were placed as a potential "back-up" mechanism in case the intoxication did not result in death.

DISCUSSION/CONCLUSION: Cable ties (zip ties, lock ties, tie wraps) provide a relatively quick and simple means of encircling and tightening a ligature device around an object or group of objects. Although suicidal cable-tie ligature strangulation has been reported in the forensic literature,1-3 the use of cable-ties in homicidal ligature strangulation has only been reported in the German literature.[4] The presentation serves to highlight these unusual cases.

NON-BACTERIAL THROMBOTIC ENDOCARDITIS PRESENTING WITH BULLAE AND BLINDNESS

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Non-bacterial thrombotic endocarditis (NBTE), also known as marantic endocarditis, is a potential complication that can arise in association with cancer. Presented here is a case of marantic endocarditis in the setting of metastatic adenocarcinoma. A 78 year old male with a history of cerebrovascular accident, paroxysmal atrial fibrillation on rivaroxaban, bioprosthetic aortic valve, and recent laparoscopic cholecystectomy, presented with acute transient visual loss of the right eye that lasted for ten minutes and abdominal pain. Imaging was negative for any acute findings. Physical exam was significant for multiple large intact and ruptured bullae and ecchymotic lesions on bilateral feet. One week prior to presentation, patient had presented again with abdominal pain and computed tomography of the abdomen was performed showing multiple hypodense hepatic lesions, the largest being 5.7x3.4cm. Transesophageal echocardiogram displayed a 1.5x1.8cm mobile mass attached to the prosthetic aortic valve. Multiple blood cultures were negative for growth. Biopsy of the liver lesions ultimately revealed metastatic gastrointestinal adenocarcinoma. Patient was subsequently diagnosed with NBTE. With patient's newly diagnosed metastatic cancer and multiple comorbidities, patient was discharged home with home hospice management. Non-bacterial endocarditis should always be suspected in patients with negative blood cultures, as it can cause further complication to an already complex case and requires systemic anticoagulation and/or surgery if aggressive treatment is desired.

AN UNUSUAL PRESENTATION OF PYELONEPHRITIS IN AN ADOLESCENT

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A 17 year old female with a prior history of pyelonephritis presented initially to outpatient clinic with sharp diffuse abdominal pain, nausea, vomiting, diarrhea, and fevers over the course of three weeks. She was also found to have a 20 lb weight loss over 6 months and initial labs showed moderate transaminitis, anemia (Hemoglobin 7.7), and UA suggestive of a UTI with Large Leukoesterase, 4+ Bacteria and >100 WBCs. She was admitted to the hospital for work up of symptomatic anemia, unintentional weight loss and transaminitis and was given 1 g of Rocephin in the ED for UTI. Initially there was concern for undiagnosed Inflammatory Bowel disease that may account for anemia, weight loss, transaminitis, abdominal pain and diarrhea. Had an abdominal CT not been performed where renal enhancement with mild right perirenal inflammation was seen the diagnosis of pyelonephritis may have been missed altogether. After receiving a unit of RBCs and proper treatment for pyelonephritis, she was able to be discharged home where an extensive work up by hematology revealed iron deficiency due to diet. She regained the weight within a month after discharge and her transaminases trended down to normal. The diagnosis of pyelonephritis was delayed in this patient because of her significant weight loss and anemia and too early narrowing of the differential for abdominal pain in a teenage girl. In this case due to the vague symptoms, abdominal imaging should have been performed earlier and would have helped narrow down the differential.

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