Rocky Vista University presents

SPRING RESEARCH DAY

PUBLIC HEALTH

May 16th, 2024

EVENT PROGRAM



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WELCOME LETTER

Welcome to Rocky Vista University's 1st Annual Spring Research Day!

We are thrilled to announce the introduction of Spring Research Day, a new addition spurred by the significant expansion of research activities at Rocky Vista. This event complements our traditional Fall Research Week and underscores our commitment to fostering academic exploration.

This year, Spring Research Day will focus on public health and showcase the scholarly achievements of our students, faculty, and staff. The event will kick off with a Poster Session on each campus, featuring projects that have met our benchmark criteria. Unlike our fall event, the posters at Spring Research Day will not be judged but will be available for everyone to view. We encourage all students, faculty, and staff to attend and engage with the presenters.

We are privileged to have some incredible Keynote Speakers this year including Dr. Steve Holloway and Dr. Sandra Fuente. Our Keynote Speakers will be presenting in person on each campus, and we will make recordings of their presentations available for those who wish to view them later.

We extend our gratitude to everyone who has contributed to making Spring Research Day possible and memorable. Thank you for joining us today. We hope you leave feeling inspired and intellectually enriched.

Happy Researching!

Amanda Brooks, PhD

Vice Provost of Research and Scholarly Activity

Professor of Molecular Biology

Rocky Vista University



SCHEDULE OF EVENTS

COLORADO

3:00 - 5:00 PM	Poster Session In Person - 2nd Floor outside of Cafeteria
5:30 - 6:00 PM	Light Appetizers and Networking In Person - Tables near posters
6:00 - 6:30 PM	Keynote Speaker: Dr. Steve Holloway In Person - Auditorium II

MONTANA

12:00 - 1:00 PM	Poster Session & Light Appetizers In Person - 2nd Floor Main Hallway and Loft Area outside the RimRock Classroom
5:30 - 6:00 PM	Light Appetizers and Networking In Person - Seminar Rooms 3 and 4
6:00 - 6:30 PM	Keynote Speaker: TBD In Person - Yellowstone Hall

UTAH

3:00 - 5:00 PM	Poster Session In Person - 1st Floor
5:30 - 6:00 PM	Light Appetizers and Networking In Person - Tables near posters
6:00 - 6:30 PM	Keynote Speaker In Person - Auditorium 1



KEYNOTE SPEAKER - DR. HOLLOWAY

A Public Health Framework for Primary Care Workforce Analysis: Leveraging Big-Data to Address Colorado's Primary Care Clinician Shortages

Dr. Steve Holloway

Abstract: Amid growing challenges in primary care delivery and workforce allocation, Colorado's Primary Care Office leverages innovative data strategies and assessment methodologies to optimize resource distribution, targeting critical primary care shortages. This session explores innovation in data, analysis and planning to guide effective policy that supports primary health access.

Description: Primary care health professional shortages have been identified as a matter of public policy since at least 1969. In response to the distributional and access challenges caused by geography, insurance status, race, language, and other factors, public health has sought to accurately determine relative workforce needs across communities and direct incentives to primary care clinicians to practice in communities of greatest need.

Though the imperative to high-quality assessment remains, federal models for determining shortages have changed little since the mid-1970s, and the underlying data necessary to accurately elucidate community need remains elusive to acquire, manage, and maintain.

In recognition of these challenges, the Colorado Primary Care Office has innovated in primary care workforce data collection, analysis, and planning. These efforts are imperative to effectively inform policy decisions with data and evidence, strategically allocating resources to areas of greatest need in Colorado.

This session will review the construction and design of the Colorado Health Systems Directory, which is perhaps the most reliable and comprehensive health workforce dataset available in Colorado. Then, based on the foundational data derived from the system, this session will describe an innovative "variable two-step floating catchment area" model of primary care workforce needs assessment. This method allows for a nuanced assessment of community-level access needs according to local demographic characteristics indicative of primary health demand. This analysis not only informs the allocation of clinician practice incentives such as loan repayment but also guides other vital state resource allocations, across state agencies, to areas facing the most severe shortages in primary health services and resources. Finally, this session will review an analysis of over 500 million claims to determine "natural" service areas for primary care according to how patients chose and acquire care across communities.

Insights from these three domains of research may inform primary care workforce policy both in the United States and internationally. In this session, participants will gain a deeper understanding of how public health policy operates to support primary care practice and address primary health equity access needs.

Steve Holloway, MPH
Primary Care Office
Colorado Department of Public Health and Environment



KEYNOTE SPEAKER - DR. FUENTE

Emotional Well-Being, the Key to Acculturation and Success for the Latino-Immigrant Community. A Public Health Matter.

Dr. Sandra De La Fuente

The journey of Latino immigrants in the U.S. is marked by innumerable challenges, including cultural adaptation, language barriers, and the navigation of unfamiliar social structures. Central to overcoming these challenges is the cultivation of emotional well-being. As immigrants navigate the complexities of acculturation, their ability to manage stress, cope with cultural adjustments, and maintain a positive mental outlook emerges as a critical determinant of success.

Emotional well-being acts as a foundation for effective acculturation by influencing various aspects of an individual's life. For Latino immigrants, the acculturation process involves balancing the preservation of their cultural identity with the incorporation of new cultural elements. In this presentation we will share our observations regarding how Latino Initiative for Emotional-Wellbeing through its programs provides tools to the Latino community in Utah, so they can develop a positive emotional state and facilitate a smoother integration, fostering a sense of belonging and reducing the psychological toll associated with cultural adaptation

Through our educational and intervention programs we have confirmed the relevance of having a strong emotional foundation that allows our community to better navigate educational challenges, engage in networking opportunities, and persevere through the inevitable setbacks encountered in pursuit of their goals. We have had a great experience with our community creating structures to promote emotional well-being -emotional support groups, focus groups, educational workshops, social networks-, and providing mental health resources that play vital roles in providing avenues for expression, understanding, and support. The synergy between emotional well-being and community support creates a resilient environment that empowers Latino immigrants to thrive amidst the acculturation process.



COLORADO

1	Analysis of Ehlers Danlos Syndrome Associated Tendon Ruptures	Ally Spohn, Bryce Hall, Robert Tolson, Dr. James Small, Dr. Chris LaFontano
2	Assessment of Medical Students' Attitudes Towards Substance Use Disorder (SUD) and Alcohol Use Disorder (AUD).	Brittany Quinn, Jennifer Frazee, Marina Yamada, Sophie Zachary, Megan Schrage, Alma Dizdarevic, Dr. Mark Payton, DR. Rachel Linger
3	Comparative Analysis of Complication Rates in Rheumatoid Arthritis and Non-Rheumatoid Arthritis Patients Undergoing Patellar Tendon Repair	Bryce Hall, Caleb Wagner, Stephen Wong, Kaitlin Williams, Jillian Hull, Dr. Isain Zapata, Dr. Amanda Brooks
4	Virtual Curriculum Completion and Academic Performance in Colorado High School Students	Cooper Sclar, Monia Nixon, Kevin Eells, Dr. Isain Zapata, Dr. Qamrul Choudhury, Rachael Martino
6	Perioperative Nerve Blocks and Postoperative Pain Outcomes During Robotic Assisted Laparoscopic Surgery	DiAnna Moreno, Katherine Grobengieser, Trista Punt
7	Electrosurgery-Induced Vagal Reflex Resulting in Complete Heart Block during Posterior Lumbar Fusion	Ellen Sprouse, Lloyd Wesley Mobley, Dr. Ian George
8	Examining the Effect of Virtual Reality in Alleviating Symptoms of Dementia: A Scoping Review	Eric Stone, Andrea Schmitt, Dr. Brian Schwartz
9	Anatomical Variations in Finger Flexors Revealed on Ultrasound	Ethan Kromberg, Zachary Ryan, Harrison Steins, Dr. Kathryn Vidlock
10	Laparoscopic Gynecase: Evaluating the Impact of Integrating a High-Fidelity Surgical Simulator on Students' Anatomical Knowledge and Surgical Confidence	Guillaume Cachot, Shivani Dixit, Dr. Jennifer Gaide
11	Spontaneous Pneumothorax from Bullae in an Azygos Lobe	Joshua Perch, Dr. Daniel Gross
12	Reducing the Cardiotoxicity of Doxorubicin: Exploring Concomitant Therapies with Cardioprotective Abilities	Andrea Schmitt, Ally Spohn, Katherine Grobengieser, Jessica Kirk, Lynne Stephenson, Dr. Dean Gubler



13	Septic Pelvic Thrombophlebitis from a Previously Undiagnosed Vaginal Wall Abscess: A Case Report	Katherine Grobengieser, Sean Stephens, Dr. Shannon Forseter
14	Fostering Wellness: Reflecting on the Implementation of Hettler's Model of Wellness Programming at the Medical School Level	Katie Metzler, Holt Campion, Madison Crew, Dr. Benjamin Brooks
15	Panhypopituitarism: An Uncommon Presentation of Metastatic Breast Cancer	Sonia Abraham, Kayla Heman
16	The Perioperative Management of Bilateral Adrenalectomy for Pheochromocytoma in the Setting of Multiple Endocrine Neoplasia Type 2B	Madeline Kinney
17	Case Report: Secondary Hemophagocytic Lymphohistiocytosis with Associated Central Pontine Myelinolysis	Rachel Philip, Mariam Alam
18	Continuous Educational Outreach Initiatives to Rural High Schools and The Lasting Impact on Students Attitude Towards A Career In Healthcare	Meagan Crouse, Rebecca Bolen, Logan Shouse, Jerrica Dennis, Dr. Mark Payton, Dr. David Ross
19	Rising Endemic Leishmaniasis Cases in United States and Exposing the Vital Role of Healthcare Providers in Awareness and Management	Mia Panlilio, Olnita Martini, Elizabeth Tchernogrova, Alexa Carboni, Danielle Duffle, Dr. Leslie Torgerson
20	Rectal Syphilis: A Diagnostic Challenge	Nathan Huber
21	Case Series: Postural Orthostatic Tachycardia Syndrome (POTS) as an Adverse Event to Human Papilloma Virus (HPV) Vaccine and its Relationship to Ehlers Danlos Syndrome	Nicole Schipperijn, Megan Wijesinghe, Dr. Ben Brooks
23	Impact of Telehealth on Screening and Longitudinal Glaucoma Management: A Literature Review	Raechel McDaniel, Tiffany Nguyen, Alicia DuPont, Dr. Qamrul Choudhury
24	Understanding How Race-Based Medicine Perpetuates Inequity	Sonia Abraham, Phillip Khong, Dr. Daniel Kramer
25	Impact of Breathwork on Medical Student Performance	Kelly Dinh, Sydney Klumb, Lauren Weber, Katelyn Bercaw, Ashley Rousseau, Dr. Leslie Torgerson
26	Case Report: Transcatheter Closure of the Gerbode type Ventricular Septal Defect After Redo Mitral Valve Replacement	Tara Talebi-Talghian



27	Improving Resident Physician Interprofessional Collaborative Practice During Bedside Interdisciplinary Rounds	Thomas Andreas, Dr. Benjamin Brooks
28	Spiritual Practices and Health Outcomes: The Spiritual History	Vanessa Johnson, Kayla West, Hanna Lee, Dr. James Small

MONTANA

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32	Influence of the Myers-Briggs Type Indicator on Physiological Response to Undergraduate Medical Education (UME) Exam Environments: Dichotomy of Extraversion vs Introversion	Mackenzie Jackson, Dr. Jacquelyn Waller, Sydnee Martinez, Tori Misiaszek, Joshua Soriano
33	Cn XII Variability in Medical Education	Dr. K Vaudrey, Miriam Donohue
34	Huckleberries and Glycemic Regulation: Exploring Post-Prandial Glucose Excursions when Paired with Carbohydrates	Michael Cannone, Trae Habel, Dr. Jacquelyn Waller, Bianca McAravey

UTAH

35	Assessing Utah Family Physicians' Confidence in Treating Psychiatric Conditions	Austin B White, Andrew Roush, Dr. Benjamin Brooks
37	Drug-Induced Hearing Loss	Charlotte Mattson, Nathan Olson, Ysatis Ruiz, Qing Zhong
38	Exploring the Role of Vitamin B12 in Acne Vulgaris and Potential Solutions Through Synthetic and Natural Supplements	Claudia Nguyen, Colleen Moisa, Lynne Stephenson



39	Unveiling Tiktok's Impact on Rhinoplasty: Advancement or Adverse Influence?	Colleen Moisa, Claudia Nguyen, Lynne Stephenson
40	Investigating Sexual Dysfunction in Patients on Isotretinoin, and Evaluating Patient Education Practices among Dermatologists: Survey Study	Elizabeth Tchernogorova, Eve Golden, Natalia Correa, Olnita Martini, Taylor Runion, Alyssa Quinn, Dr. Amanda Brooks
41	Introduction to Investigating the Impact of Gua Sha Therapy on Cytokine Regulation	Elizabeth Tchernogorova, Danielle Duffle, Nicole Skalka, Mary Tidwell, Olnita Martini, Iza Dziedzic
42	Case Report: Eliminating Dairy as a Novel Treatment in Acne Vulgaris	Olnita Martini, Elizabeth Tchernogorova, Ryan Cox, Parker Miller, Mary Tidwell, Nicole Skalka, Dr. Benjamin Brooks
44	Cimex Lectularius Outbreak: The Dermatologist Role in Mitigating the Expanding Infestations	Mia Panlilio, Elizabeth Tchernogorova, Sabrina Woessner, Olnita Martini, Dr. Leslie Torgerson
45	Exploring the Relationship between Ichthyosis and Scalp Paresthesia: Potential Connection and Treatment Approach with Fluocinolone	Elizabeth Tchernogorova, Parker Miller, Olnita Martini, Ryan Cox, Nicole Skalka, Mary Tidwell, Dr. Benjamin Brooks
46	Long itudinal Study of Spontaneous Remission of Vitiligo: A Case Report	Ryan Cox, Mary Tidwell, Elizabeth Tchernogorova, Olnita Martini, Nicole Skalka, Parker Miller, Dr. Benjamin Brooks
47	Exploring a New Immunotherapy Treatment for Recalcitrant Verrucae	Kendrick Rubino, Elizabeth Tchernogorova, Corinne Ricci, Morgan Zueger, Jessica Kirk, Dr. Benjamin Brooks
48	Heterotopic ossification following bilateral ischial tuberosity avulsion fractures	Kaiser Nieman, Cody Majeskie, Erin Robbins, Lynne Stephenson
49	Enhancing Safety and Communication in Anesthesia Care Team Models: A Voluntary Survey- Based Research	Gregory Madsen, Hugh Zhang, Sanad Naber, Dr. Amanda Brooks, Dr. Craig Atkins
50	Navigating Unexpected Pathology in Cadaver Dissection as a First-Year Medical Student: A Multinodular Thyroid Analysis	Kodi Jo McKinlay, Dresdan Quackenbush, Kayla Johnson, Christian Klena, Dr. Amberly Reynolds



51	Gastric Ultrasound: A quick Perioperative Solution for Semaglutide Patients	Madison Garlock, Miranda Speth, Dr. Mark Wardle
52	Postpartum Depression in Lower Income Countries: Social Support Critical	Madison Garlock, Miranda Speth, Shaun Schofield, Marcos Muller, Logan Wesemann, Dr. Mark Wadle, Matthew McEchron
53	Effects of Extended Reality on Intraocular Pressure	Mckay Berges, Jacob Wagner
54	Embracing Intimacy: Enhancing Sexual Health in Aging Populations	Melanie Herbert, Mikaela Cavalieri, Zainab Khan, Michelle Wood, Lynne Stephenson, Dr. Amberly Reynolds
55	Unveiling Distinctive Symptoms and Screening Strategies for Early Detection and Treatment of Solid Pseudopapillary Neoplasm of the Pancreas	Michael Richardson, Nicholas Gerber, Catherine Wheeless, Whinkie Leung, Lynne Stephenson
56	Gut Feeling: Investigating the Gut Microbiome as Treatment for Rheumatoid Arthritis	Mikaela Cavalieri, Norma Albarran, Lynne Stephenson
57	"Early Outcomes after Third Generation Trabecular Micro-Bypass Performed with Phacoemulsification in Patients with Open-Angle Glaucoma"	Nadia Alinaghizadeh, Connor Prendergast
58	Preventing Falls in Geriatric Patients through Introduction of the Feldenkrais Method	Rebecca Franklin, Alexandra Calescibetta, Parker Miler, Lynne Stephenson, Dr. Amanda Brooks
59	Access To Healthcare, Lack of Maternal Nutrition, And Low Density of Medical Provider to Patient Density and its Impact on Maternal Mortality Rate in South Asia	Sabitra Niroula
60	Exploring the Impact of Social Determinants of Health on Follow-Up Medical Care Among Sexual Assault Survivors Post-Initial Emergent Evaluation: A Literature Review	Sadie Rowland, Taylor Glanz, Lynne Stephenson
62	Examining the Relationship Between Nitrous Oxide Exposure in Dental Settings and Vitamin B12 Deficiency, with a Focus on Depression: A Literature Review	Sanad Naber, Hugh Zhang, Gregory Madsen, Dr. Amanda Brooks
63	Empiric Treatment for Unspecified Pneumonia	Tristan Cowles, Jonathan Knudsen, Dr. Chis LaFontano



64	Unusually Delayed Diagnosis of BIA-ALCL: A Case Report	Ysatis Ruiz, Dr. Jamie Moenster
66	The Role of Pain Medications in Modulating Recovery Following Peripheral Nerve Injury	Brian Chong, Jeffrey Goodwin, Dr. Amanda Brooks



Abstract #1

Analysis of Ehlers Danlos Syndrome Associated Tendon Ruptures

Ally E. Spohn, OMS-II, 2LT USA*¹, Bryce Hall, OMS-II¹, Robert Tolson, OMS-I¹, James M. Small, MD, PhD¹, Chris LaFontano, DO¹
*ally.spohn@co.rvu.edu
(1) Rocky Vista University College of Osteopathic Medicine

Introduction

Ehlers Danlos Syndrome (EDS) is a hereditary connective tissue disorder characterized by symptoms ranging from joint hypermobility, skin hypersensitivity, and soft tissue friability to vascular rupture due to defects in collagen. There are 13 identified subtypes, with almost all requiring molecular confirmation of diagnosis, except the hypermobility subtype of EDS (hEDS). hEDS is the most common subtype with a prevalence between 1:10,000 and 1:5,000 individuals. Lack of laboratory testing presents challenges, with current diagnosis made on clinical presentation. Diagnostic criterion for hEDS consists of hypermobile joints with increased prevalence of joint dislocations. In joints, less likely to dislocate, it is reasonable to consider the weakened connective tissue is more prone to spontaneous rupture. Therefore, it is hypothesized that there is a statistically higher number of patella tendon ruptures in hEDS patients.

Methods

An analysis was performed using the 2020 National Inpatient Sample (NIS) in concert with ICD-10 codes to evaluate reports of spontaneous patella tendon ruptures in patients diagnosed with hEDS. This review is intended to analyze a correlation between tendon ruptures and hEDS to evaluate what criteria should prompt physicians to evaluate for hypermobility. We aim to determine whether the Beighton Scoring System should be assessed as a preliminary measure in routine sports physicals or after a spontaneous tendon injury occurs with minor associated trauma.

Discussion

The lack of standardized hypermobility screening contributes to potentially avoidable tendon ruptures with preventative measures, such as physical therapy and strength training. Screening in combination with in-depth evaluation of previous musculoskeletal injuries may be necessary for athletes.

Conclusion

Diagnosis of hEDS may have an impact on athletic performance, as it may increase the potential for injury, specifically tendon ruptures. A future study to investigate whether the Beighton Scoring System for hypermobility could be utilized to assist in tendon injury prevention is warranted.



Abstract #2

Assessment of Osteopathic Medical Students' Attitudes Towards Substance Use Disorder (SUD) and Alcohol Use Disorder (AUD).

Brittany Quinn*¹, Jennifer Frazee¹, Marina Yamada¹, Sophie Zachary¹, Megan Schrage¹, Alma Dizdarevic¹, Mark Payton PhD², Rachel M.A. Linger PhD²

*Corresponding Author: brittany.quinn@co.rvu.edu

- (1) Affiliation 1: College of Osteopathic Medicine, Rocky Vista University (Englewood, CO)
- (2) Affiliation 2: Department of Biomedical Sciences, Rocky Vista University (Englewood, CO)

Millions of patients in the United States are diagnosed with substance use disorder (SUD) and alcohol use disorder (AUD) every year. Physicians' attitudes towards SUD and AUD can significantly impact the quality of care they provide to these patients, but these conditions are not covered extensively in most medical school curriculums. This makes it important to understand medical students' baseline attitudes towards SUD and AUD. We hypothesized that students with more extensive medical training and exposure to people with SUD and AUD would have more positive attitudes towards patients with these conditions. To test this hypothesis, we assessed medical students' attitudes towards SUD and AUD given their: 1) self-reported level of exposure to this population, 2) level of medical training, and 3) desire to work with SUD and/or AUD patient populations in the future. A 41-question Qualtrics survey was distributed amongst 1st-4th year osteopathic medical students on the Colorado and Utah campuses of Rocky Vista University and 334 students responded to the survey. Our analyses showed that exposure to SUD and AUD increased in a linear fashion over the four-year curriculum, but second-year students had the most negative views towards SUD (p = 0.0046). The surveyed second-year students were also less likely than clinical students (third- and fourth-year students) to believe resources should be dedicated to supporting and treating individuals with SUD and AUD (p = 0.0194). Additionally, students with an interest in working in addiction medicine were more likely to support devoting resources to individuals coping with these conditions (p=0.036). The current literature focuses on the attitudes of allopathic medical students, with only three studies including osteopathic medical schools. While these three studies focus on opioid use disorder, we have added to this literature by assessing osteopathic medical students' attitudes towards SUD and AUD. Establishing this baseline understanding of medical students' attitudes highlights the importance of increased training on and exposure to substance use disorders in medical school. Future studies could expand on this research to include a variety of medical schools, use a control group, and collect data longitudinally.



Abstract #3

Comparative Analysis of Complication Rates in Rheumatoid Arthritis and Non-Rheumatoid Arthritis Patients Undergoing Patellar Tendon Repair

Bryce Hall*¹; Caleb Wagner, MS²; Stephen Wong, MS²; Kaitlin Williams¹; Jillian Hull, MS²; Isain Zapata, PhD¹; Amanda E. Brooks, PhD^{1,2}

- *Corresponding Author: Bryce.hall@co.rvu.edu
- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO
- (2) Rocky Vista University College of Osteopathic Medicine, Ivins, UT

The incidence of patellar tendon (PT) ruptures is relatively infrequent with an annual incidence of 0.68 per 100,000 people. Certain systemic conditions, notability Rheumatoid Arthritis (RA), elevate the risk of PT ruptures. Despite the severity and life-altering nature of a PT rupture, current literature on optimal surgical management in the context of RA is notably sparse. Early on in the disease progression, RA spreads to tendons causing inflammatory alterations to the tendon, which may be mediated by collagenases. Furthermore, immunosuppressants, such as corticosteroids, are commonly first-line therapy for treatment of RA, which may increase operative complications. Lastly, there is little data to determine if RA patients require additional factors to maximize healing. The type of technique used for repair, such as transosseous (TO) tunnel repair or suture anchor (SA) fixation, is a substantial contributing factor to consider in the healing of PT rupture in RA patients. Importantly, the most bio-mechanically optimal construct for repair remains unknown, and there is limited literature on how to improve repair outcomes, with data on RA patients being even narrower. This analysis aims to determine complication rates related to surgical PT tendon repair in patients with RA versus those without RA. This analysis was completed by mining the 2020 National Inpatient Sample (NIS) using ICD-10 procedure codes beginning with 0LQQ and 0LQR to identify right and left PT repairs. Charts were identified (n=744), and ICD-10 codes beginning with M05 and M06 were used to identify patients that had a diagnosis of RA (n=22). ICD-10 codes that began with T84 were used to identify complications associated with the repairs, and the RA patients with complications (n=8) were compared to the non-RA patients with complications (n=108). Analysis showed a statistically significant increase in the number of complications experienced by the RA patients when compared to the non-RA patients (p = 0.0138). These results, if replicable in a larger and more comprehensive study, could help provide better post-operative treatment strategies to RA patients receiving patellar tendon repairs as their providers could be more prepared to anticipate a higher frequency of certain complications. This study was limited by what narrow data could be mined and analyzed using only existing ICD-10 codes, as well as the limitations of the 2020 NIS database as it does not encompass nearly all the existing patient data from 2020.



Abstract 4

Virtual Curriculum Completion and Academic Performance in Colorado High School Students

Cooper Sclar MS OMS-II *1, Monica Nixon MS RD OMS-II 1, Kevin Eells OMS-II 1, Isain Zapata PhD 1,2, Qamrul Choudhury PhD 1,3, Rachael Martino OMS-II 1 *Corresponding Author: Cooper.Sclar@rvu.edu

- (1)Rocky Vista University College of Osteopathic Medicine, Parker, Colorado
- (2) Assistant Professor of Research and Statistics in the Department of Biomedical Sciences
- (3) Associate Professor of Physiology in the Department of Biomedical Sciences

Virtual and online curriculum has become an integral component in education. High school education is critical for a student's success in standardized tests, graduation, and acceptance into higher educational programs. There is a lack of information regarding academic success in high school students with completion of virtual curriculum. We aimed to determine how online learning correlates with high school standardized test scores and graduation rates in Colorado.

We retrospectively reviewed Colorado high schools that are completely online to high schools that are completely in person. There are 9 online high schools in Colorado with public SAT and graduation rates. Each online school was matched in a 1:1 ratio with an in-person high school based on the total number of high school students. 2022 SAT scores and their classes' corresponding graduation rates in 2023 were used as the comparison between online and inperson schools. SAT and graduation rate data was collected from the Colorado Department of Education. Total online curriculum was provided by individual high schools.

Average graduation rates were significantly lower in online high schools. The average 2023 graduation rate for in-person schools was 91.99%, while online schools was 64.88% (p=0.0001). Based on the 2022 SAT scores there was not a significant difference between the online high schools and in-person high schools (p=0.1054). However, there was a 51.11-point difference in the average SAT scores. Online high schools scored an average of 893.44 points, while in-person high schools scored higher with an average of 944.55 points.

Our pilot study suggests that online curriculum and learning are not superior to in person education when discussing retainment and continuing education. More data needs to be collected as SAT score and graduation rates are not the only determinant of academic success. A follow up study would include aspects of online and in person schools involving students' ethnicity, health, diet, economic background, living situation, involvement in sports and extracurricular activities, their mental status, as well as their success after formal education in the professional world.



Abstract #6

Perioperative Nerve Blocks and Postoperative Pain Outcomes During Robotic Assisted Laparoscopic Surgery

DiAnna Moreno, OMS IV *1, Katherine Grobengieser, OMS IV 1, Trista Punt, OMS IV 1, Dr, Farshad Farnejad, MD, MPH, FACS 2

- *Corresponding Author: dianna.moreno@co.rvu.edu
- (1) Rocky Vista University of Osteopathic Medicine, Parker,
- (2) North Suburban Medical Center, Thorton, CO

Opioids have become increasingly prevalent in present postoperative pain management guidelines, raising concerns regarding drug abuse, addiction, increased hospital stays, and financial burdens. This study investigates the impact of perioperative nerve blocks on reported postoperative pain during robotic assisted laparoscopic surgery, hypothesizing that nerve blocks offer more comprehensive analgesia in the immediate postoperative period compared to conventional methods.

We conducted a comprehensive investigation utilizing a post-surgical survey administered to 63 total patients that underwent various robotic laparoscopic surgeries, with a target goal of 50 receiving nerve blocks and 50 without. Data collection began in April 2023 and is ongoing for the nerve block cohort, which currently includes 13 patients. The survey questions assessed patient pain scores on postop days 1, 3-4, and the first office visit with a 1-10 scale. Additional questions gauged opioid quantity, type, and length of usage.

Out of 50 patients that did not have a nerve block, 55.3% used oxycodone for pain relief. Post operative pain averaged 6.5 for Cholecystectomy on day 1, 5 on day 3-4, and 1.25 at post op visit. Hernia repair averaged 6.5 for day 1, 5 on day 3-4, and 2.5 at post op visit. Other surgeries included an average of 8.25 on day 1, 5.25 day 3-4, and 2 at post op visit. Patients averaged usage of opioids for 5 days for a hernia repair and 3.5 for cholecystectomy.

Out of the 50 patients that did receive a nerve block, 46% reported using Oxycodone for pain relief. Post operative pain averaged 6 for Cholecystectomy on day 1, 2.1 on day 3-4, and 2 at post op visit. Hernia repair averaged 6 for day 1, 2.1 on day 3-4, and 2 at post op visit. Other surgeries included an average of 7 on day 1, 4 day 3-4, and 2.5 at post op visit. Patients averaged usage of opioids for 5 days for a hernia repair and 3.5 for cholecystectomy.

Our initial findings support the potentially valuable role that perioperative nerve blocks play in post-operative pain management, as evidenced by decreased duration and total opioid usage in the preliminary perioperative cohort. We aim to figure out more objective ways to gather data knowing the study has limitations based on subjective pain scores and self-reported scores. Future directions also include continual data collection to further elucidate the link between perceived postoperative pain and perioperative nerve blocks.



Abstract #7

Electrosurgery-Induced Vagal Reflex Resulting in Complete Heart Block during Posterior Lumbar Fusion

Ellen Sprouse*¹, Lloyd Wesley Mobley III, MD², Nicholas Agvent, PA-C², Ian George, PhD¹ *Corresponding Author: ellen.bailey@co.rvu.edu

- (1) College of Osteopathic Medicine, Rocky Vista University, Englewood, CO
- (2) Neurosurgery One, Lone Tree, CO

Electrosurgery-induced vagal reflex resulting in complete heart block is a very rare surgical complication, only cited in a few other cases in the literature. The purpose of this case report is to provide awareness of this complication, discuss possible mechanisms, and outline the appropriate management.

A 52-year-old male with no significant risk factors or prior history of cardiovascular disease presented for a posterior lumbar interbody fusion of L3 and L4. Aquamantys bipolar sealers were used to achieve hemostasis. During this time, the patient suddenly developed complete heart block that persisted for ten beats. The surgical team ceased use of the electrosurgical equipment. The patient's rhythm recovered. Upon resuming use of the bipolar sealers, the patient developed complete heart block again, this time persisting for six beats. At this time, the surgery was discontinued, and a cardiology consultation was recommended. The results of the cardiology consultation returned unremarkable, with no underlying cardiovascular risk factors or disease identified.

While there are many possible mechanisms that could have caused the vagal stimulation, it is thought that hemostasis with the bipolar sealers triggered the vagal reflex that induced the transient, episodic heart block. Bipolar sealers are designed to promote hemostasis through thermal energy-induced shrinkage of collagen fibers within the vasculature. The endothelium and smooth muscle of the vasculature is closely associated with a sympathetic nerve plexus and the destruction of these tissues during hemostasis has the potential to disrupt sympathetic signaling and promote a hyper-parasympathetic state, resulting in complete heart block.

The significance of this case compared to prior cases reported in the literature is the absence of prior risk factors or history of cardiovascular disease, signifying that this rare complication can occur in low-risk patients. It is also significant to guide the management decisions under these rare circumstances. Anticholinergics can be used to block the hyper-parasympathetic tone in the case of prolonged, refractory episodes. The surgical team maintained an appropriately conservative approach and discontinued the surgery to allow for a cardiology consultation. After clearance from cardiology, the patient returned for the same procedure, which was successfully completed with no further cardiovascular complications.



Abstract #8

EXAMINING THE EFFECT OF VIRTUAL REALITY IN ALLEVIATING SYMPTOMS OF DEMENTIA: A SCOPING REVIEW

Eric Stone MS, OMS II*¹, Andrea Schmitt OMS II¹, Veronica Champine, PhD^{2,3}, Brian Schwartz, PhD¹

- *Corresponding Author: Eric.stone@co.rvu.edu
- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO
- (2) Colorado State University, Human Dimensions of Natural Resources, Fort Collins, CO
- (3) Food for Climate League, Evanston, IL

The health benefits of being in nature are well documented, both physical and psychosocial. However, populations for whom access to nature is diminished or denied are unable to reap these benefits. These social determinants and population-based inequities can potentially be ameliorated by interacting with Virtual Nature (VN) or nature via virtual reality in the form of computer-simulated artificial environments, mimicking the therapeutic effects of nature.

In order to determine the efficacy for one specific population, we sought to investigate the literature on a potential relationship between virtual nature and dementia symptoms across multiple platforms. Our preliminary search terms included, "virtual reality AND nature AND dementia." Inclusion criteria consisted of studies investigating virtual nature in patients with dementia between 2013-2024. Exclusion criteria included studies not performed with dementia patients and those using virtual reality without virtual nature. The initial investigation yielded 26 articles. Of these, we excluded 8 for a total of 18 articles. Initial results show that VR is generally safe to use with dementia patients, and most participants reported a positive experience. Further, patients exposed to virtual nature scenes reported decreases in agitation, anxiety, sadness, anger, and heart rate, and increases in pleasure, alertness, emotional well-being, and quality of life. These results suggest the positive effects of virtual nature on dementia symptoms and highlight the need for further experimental testing of virtual nature as a therapeutic tool for patients with dementia.



Abstract 9

Anatomical Variation in Finger Flexors Revealed on Ultrasound

Ethan Kromberg OMS II¹, Zachary Ryan 2LT, MS, OMS II¹, Harrison Steins, MS, OMS II¹, Kathryn Vidlock MD¹

Corresponding Author: ethan.kromberg@co.rvu.edu

(1) Rocky Vista University, Department of Ultrasound, Parker, CO Campus

Here we report a case of an active 25-year-old male with the main complaint of interdependent flexion of their first and second digits. The patient reports he first noticed this anomaly several years ago, though it was not until recently that he acknowledged the potential for a true anatomic variation or pathology. He denies any pain or limitation in his daily life, and even has a history of playing competitive piano, as well as football at the collegiate level. On examination the patient demonstrates an inability to flex the thumbs without simultaneously flexing the second digit, and to some degree the third digit, affecting both hands. For the workup of this presentation, ultrasound imaging was obtained by an American Registry for Diagnostic Medical Sonography (ARDMS) certified sonographer that looked at the anterior aspect of the carpal region. The patient was instructed to flex their thumb at the interphalangeal joint while the sonographer was scanning. Upon passive flexion of the thumb, the flexor pollicis longus tendon was observed sliding proximally, while simultaneously moving the flexor digitorum profundus tendon with it. This is the hallmark feature of Linburg-Comstock syndrome, an anatomical anomaly wherein the flexor digitorum profundus and flexor pollicis longus tendons have a fibrous interconnection causing movement in one to then affect the other. The Linburg-Comstock anomaly is not well documented in the literature, especially as it pertains to the use of ultrasound imaging in the workup. This case study serves as an example of the relative ease with which one can identify anatomical anomalies in musculoskeletal ultrasound, particularly Linburg-Comstock syndrome. Surgical correction is an option in these patients, though due to lack of pain or impact on daily activity, this patient made the decision to forgo any form of intervention at this time. Finally, this case further highlights potential for full unimpeded function of the upper extremities despite this anatomical variation.



Abstract #10

Laparoscopic Gynecase[™]: Evaluating the Impact of Integrating a High-Fidelity Surgical Simulator on Students' Anatomical Knowledge and Surgical Confidence

Guillaume Cachot*^{1,2}, Shivani Dixit^{1,2}, Jennifer Gaide DO²

*Corresponding Author: guillaume.cachot@rvu.edu

(1) Affiliation 1: Rocky Vista University, COM, Parker, CO

(2) Affiliation 2: Office of Simulations in Medicine and Surgery (SIMS), RVU, Parker, CO

The use of simulation-based education in medical curricula has been recognized as a critical component in improving surgical skills. Although the field of surgical simulation traditionally emphasizes technical skills training to learn a specific skill or operative procedure, there is a rising emphasis on cognitive learning as an essential factor in simulation training. A significant disparity exists between classroom-acquired theoretical knowledge and the practical skills needed in clinical settings, often causing student anxiety during the transition to clinical rotations. We propose employing a cognitive learning tool such as the high-fidelity Laparoscopic GynecaseTM Surgical Simulator to bridge this gap. This platform offers an interactive and realistic setting for students to hone their skills and deepen their understanding of gynecologic anatomy from a laparoscopic perspective.

We assessed if the Gynecase Simulator improved medical students' anatomical knowledge and surgical confidence. We compared faculty-guided Gynecase sessions to self-guided sessions with standard laparoscopic trainers using video support. 31 medical students from Rocky Vista University Colorado Campus, including first-year students (n=17) and second-year students (n=14), participated in the study.

Through pre- and post-intervention assessments and surveys, our results showed that Gynecase users reported increased confidence in several skills, underlined by significant improvements in perceived educational value and surgical confidence, notably in identifying anatomical structures (mean improvement of 0.29 with p=0.027) and applying surgical knowledge (mean improvement of 0.26 p=0.044). Gynecase users also showed higher mean improvement in knowledge-assessment scores (0.57 vs. 0.13), with marked improvements seen for kinesthetic learners (1.00 with p=0.064) and second-year students (1.36 with p=0.0012).

Our findings suggest that simulation training with the Laparoscopic Gynecase significantly enhances students' learning outcomes and confidence, especially for kinesthetic learners and students with more advanced education. The observed increase in confidence and skill with Gynecase encourages further research into how simulation-based education can be tailored to diverse learning needs. Future studies should explore the impact of learner-specific characteristics and the broader potential of simulation in medical education.



Abstract # 11

Spontaneous pneumothorax from bullae in an azygos lobe

Vincent Bustamante DO*1, Joshua Perch OMS-III², Daniel Gross MD^{1,2}

*Corresponding Author: vincentbustamante2@centura.org

(1) Affiliation 1: St. Anthony's Hospital, Lakewood, CO

(2) Affiliation 2: Rocky Vista University COM, Parker, CO

Azygos lobes are a rare anatomical variant of the right lung formed embryologically when the posterior cardinal vein, a precursor to the azygos vein, invaginates through the right upper lobe forming a mesentery attachment (meso-azygos) and an extra fissure. While it is a misnomer, as it does not have a dedicated bronchus, its presence is rare with an estimated prevalence between .4-1.2%. Even more rare is the occurrence of a bullae formation within an azygos lobe, as it has been previously theorized to have features that protect against bullae formation, with only a handful of cases previously described. We present a tall, thin, daily smoker, eighteen-year-old male patient with a primary spontaneous pneumothorax that was refractory to multiple attempts at re-expansion with tube thoracostomy at two rural hospitals prior to transfer for definitive care. He was diagnosed preoperatively with an Azygos lobe based on obtained imaging and clinical correlation. He was also noted to have aberrant bronchial anatomy, specifically he lacked a right upper lobe bronchus. He was surgically managed by our team with a robot-assisted wedge resection, azygos vein resection, pleurectomy, and pleurodesis resulting in resolution of his symptoms. Whereas other previous authors have converted to open thoracotomy due to adhesions, or left the azygos vein intact, we resected both the meso-azygos and azygos vein, as the ability of intricate dissection achieved with robotic surgery allowed this. This case describes a rare set of circumstances in medicine, review of an anatomical variant that was missed pre- operatively, and operative considerations for management in the setting of robotic surgery.



Abstract # 12

Reducing the Cardiotoxicity of Doxorubicin: Exploring Concomitant Therapies with Cardioprotective Abilities

Andrea Schmitt OMS-II*¹, Ally E. Spohn OMS-II¹, Katherine Grobengieser OMS-III¹, Jessica Kirk OMS-III¹, Lynne Stephenson MSEd², K. Dean Gubler DO, MPH, CAPT(Ret) USN²

*Corresponding Author: Andrea.Schmitt@co.rvu.edu

(1) Affiliation 1: Rocky Vista University COM, Parker, CO

(2) Affiliation 2: Rocky Vista University COM, Ivins, UT

Doxorubicin, an anthracycline agent, has been a vital and effective chemotherapeutic agent for decades for varying types of cancer, most specifically breast cancer. Of its significant side effect profile, the most devastating and life-threatening being irreversible cardiotoxicity and dilated cardiomyopathy with a notable reduction in left ventricular ejection fraction (LVEF). The severe cardiotoxic side effects limit its utilization. We hypothesized that the augmentation of Doxorubicin as a chemotherapeutic agent with coadministration of various other medications and supplements may mitigate these cardiotoxic effects.

A structured literature review was performed on PubMed. The search strategy criterion consisted of the inclusion criteria including human clinical trials examining Doxorubicin as the main chemotherapeutic agent conducted between 2018 and 2023. Preliminary search terms used included "doxorubicin + cardiotoxicity" and "doxorubicin + adverse events." Exclusion criteria included studies conducted on rodent populations and trials where cardiotoxicity was not the main adverse event studied. Following the initial search, article inclusion for this review was narrowed from 47 articles to 12.

Initial search parameters yielded 47 results, based on exclusion criteria 34 articles were not included resulting in 12 articles included in this review. Across these trials additional agents included: Carvedilol, Enalapril, Donepezil, Candesartan, and Dexrazoxane. demonstrated cardioprotective effects by reducing the decline in LVEF when administered alongside Doxorubicin. Additionally, several supplements, including Omega-3 Fatty Acids, Alpha-Lipoic Acid, Black Seed Oil, and Panax Ginseng, demonstrated promising cardioprotective effects in coadministration with Doxorubicin.

Despite these positive findings, data is limited and not generalized to all populations. To further elucidate the potential benefit of multidrug Doxorubicin regimens in the reduction of adverse side effects, larger-scale prospective clinical trials are necessary for all concomitant therapies. These results suggest potential avenues for minimizing Doxorubicin's cardiotoxic effects on patients undergoing chemotherapy, but there are limitations. These include a small number of studies reported in the literature, limited number of patients in these trials, and lack of long-term follow-ups since cardiotoxicity has the potential to manifest years after completion of Doxorubicin chemotherapy.

Amongst the identified agents, majority provided cardioprotective effects and prevented decline in LVEF during Doxorubicin chemotherapy but results are limited beyond completion of treatment regimens. The long-term effects of these concomitant therapies are still being investigated in clinical trials. Future directions include designing studies to follow LVEF and cardiac biomarkers for several years following completion of coadministration of Doxorubicin with these agents.



Abstract 13

Septic Pelvic Thrombophlebitis From a Previously Undiagnosed Vaginal Wall Abscess: A Case Report

Katherine Grobengieser OMS-III*1, Sean Stephens OMS-III1, Shanon Forseter MD1,2,3

*Corresponding Author: Katherine.grobengieser@co.rvu.edu

- (1) Affiliation 1: Rocky Vista University COM, Parker, CO
- (2) Affiliation 2: Cisneros Center for Obstetrics and Gynecology, Thornton, CO
- (3) Affiliation 3: North Suburban Medical Center, Thornton, CO

Septic Pelvic Thrombophlebitis (SPT) is a rare and severe gynecologic complication that can occur after abortion, delivery, pelvic infections, or surgeries. Most commonly SPT is associated with pregnancy - specifically delivery or the postpartum state; however, this standard presentation is not always the case.

A middle-aged female presented to the emergency department in acute sepsis with chief complaints of abdominal pain and diffuse body aches. Imaging revealed non-specific pelvic inflammation suggesting salpingitis or cystitis from an unknown source. The patient was then transferred to the ICU where the general surgery team was consulted to rule out retroperitoneal abscess. The patient continued to decline and was taken to the OR with a pre-operative diagnosis of septic shock. Perioperatively, a previously undiagnosed 3cm vaginal wall cyst was incised and drained of purulent material. Laparoscopic inspection of her pelvis revealed a dusky and necrotic right adnexa with an enlarged, edematous uterus. The patient subsequently underwent laparoscopic right salpingectomy with oophorectomy. Cystoscopy showed an edematous but intact bladder and ureteral jets. Postoperative diagnoses included right adnexal torsion with septic thrombosis secondary to the abscess. The patient was promptly started on broad spectrum IV antibiotics and anticoagulation and remains in critical condition in the ICU, where numerous postoperative complications continue to impact her treatment course.

Although idiopathic SPT is a rare phenomenon, it can have a devastating prognosis and lasting complications, so education on its pathophysiology is imperative. SPT requires serious consideration when evaluating any female patient with nonspecific systemic symptoms and diffuse abdominal and flank pain. Ultimately, this case report highlights both the critical role that diagnostic laparoscopy plays in the definitive diagnosis of SPT, particularly when imaging studies are inconclusive, and the crucial role that anticoagulation plays in its treatment.



Abstract 14

Fostering Wellness: Reflecting on the Implementation of Hettler's Model of Wellness Programming at the Medical School Level

Katie Metzler OMS-III*¹, Holt Campion OMS II¹, Madison Crew OMS I¹ Benjamin Brooks PhD ²,

- *Corresponding Author: katie.franks@co.rvu.edu
- (1) Affiliation 1: Rocky Vista University COM, Parker, CO
- (2) Affiliation 2 Rocky Vista University COM, Ivins, UT

Wellness programming at the medical school level plays a pivotal role in nurturing the health and overall well-being of students transitioning into healthcare professionals. Hettler's Model of Wellness, encompassing six dimensions—emotional, physical, social, occupational, intellectual, and spiritual—provides a comprehensive framework for such initiatives. This retrospective review examines the implementation of Hettler's Model of Wellness programming by the SGA Wellness Ambassadors at Rocky Vista University during the 2022-2023 academic year. Each month was dedicated to enhancing a specific dimension of wellness through diverse activities, guided meditations, newsletters, and challenges. The programming aimed to address the unique stressors faced by medical students and foster a supportive environment conducive to holistic wellness. Challenges in program implementation included the administrative burden on student leaders and competing academic priorities, suggesting the need for faculty support and early planning. However, the student-led nature of the initiative facilitated tailored interventions and increased student engagement. Future research endeavors should explore the impact of such programming on medical student health levels and subsequent interventions to promote longterm well-being. Prioritizing student wellness not only cultivates healthier individuals but also contributes to the development of resilient and empathetic healthcare professionals, ultimately enhancing the reputation and success of medical schools.



Abstract #15

Panhypopituitarism: an Uncommon Presentation of Metastatic Breast Cancer

Matthew Nelson, DO, PGY-2¹, Jessie Wampler, DO, PGY-2¹, Sonia Abraham, OMS-III², Kayla Heman, OMS-III^{2*}, Meg Burke, MD¹

*Corresponding Author: kayla.heman@co.rvu.edu

(1) Affiliation 1: HealthONE Sky Ridge Medicine Center Internal Medicine Residency, Lone Tree, CO

(2) Affiliation 2: Rocky Vista University College of Osteopathic Medicine, Parker, CO

Metastatic breast cancer represents a significant challenge in clinical oncology, often manifesting with diverse and atypical symptoms. The most common sites of metastasis include bone, lung, liver, and brain. Pituitary metastasis is a rare but recognized phenomenon, occasionally presenting with panhypopituitarism. Cases of pituitary metastasis are most often reported in patients with known current or prior diagnosis of breast cancer, but we present a unique case of panhypopituitarism as the initial manifestation of undiagnosed metastatic breast cancer.

A 55-year-old female with no prior medical history presented to the emergency department with two months of nausea, vomiting, generalized fatigue, bilateral leg rash, and intermittent severe right leg pain. Physical examination revealed a distinctive woody rash on bilateral tibiae but was otherwise unremarkable. Laboratory results and cosyntropin stimulation test demonstrated panhypopituitarism. Brain and orbital magnetic resonance imaging (MRI) revealed a markedly thickened pituitary infundibulum, heterogeneous hypoenhancement of a borderline-enlarged pituitary gland, and a suspicious lesion arising from the right medial rectus muscle. Further positron emission tomography-computed tomography (PET/CT) and biopsy results confirmed metastatic breast cancer, characterized by estrogen and progesterone receptor positivity and human epidermal growth factor receptor 2 (HER2) negativity. The patient started levothyroxine and hydrocortisone for hypothyroidism and adrenal insufficiency, and after oncology follow-up, she began anastrozole and ribociclib for treatment of her breast cancer.

This case underscores the importance of considering metastatic breast cancer in the differential diagnosis of patients presenting with panhypopituitarism, even in the absence of overt breast symptoms. Although rare, pituitary metastasis can lead to significant morbidity due to its effects on pituitary function and surrounding structures, making early diagnosis pivotal for optimizing patient outcomes. Screening mammography remains paramount for early breast cancer detection, particularly in patients with nonspecific symptoms or high-risk features. Understanding the diverse presentations of metastatic breast cancer aids clinicians in prompt diagnosis and appropriate management, ultimately impacting patient care and outcomes. This case highlights the significance of comprehensive evaluations and age-appropriate cancer screenings in patients presenting with atypical symptoms suggestive of metastatic disease. Vigilance for the diverse presentations of metastatic breast cancer is crucial for ensuring timely diagnosis and intervention.



Abstract #16

The Perioperative Management of Bilateral Adrenalectomy for Pheochromocytoma in the Setting of Multiple Endocrine Neoplasia Type 2B

Madeline R. Kinney, MS OMS-I*1, Michelle A. Ochs Kinney MD²

*Corresponding Author: <u>madeline.kinney@co.rvu.edu</u>

(1) Affiliation 1: Rocky Vista University College of Osteopathic Medicine, Parker, CO

(2) Affiliation 2: Department of Anesthesia, Mayo Clinic, Rochester, MN

Multiple Endocrine Neoplasia Type 2B (MEN2B) is a rare cancer syndrome with associated medullary thyroid carcinoma, pheochromocytoma, ganglioneuromatosis of the aerodigestive tract, and musculoskeletal and ophthalmologic abnormalities. It is caused by germline mutations of the *Re*arranged during *T*ransfection (RET) proto-oncogene. Catecholamine release during adrenalectomy for pheochromocytoma may cause life-threatening hemodynamic instability. We describe the perioperative management of a patient with MEN 2B who underwent bilateral adrenalectomy for pheochromocytoma.

A 30-year-old woman with a history of MEN2B presented for laparoscopic retroperitoneal bilateral adrenalectomy. She was experiencing paroxysmal hypertension, palpitations, and tachycardia, as well as a chronic headache. Periodic testing for pheochromocytoma demonstrated elevated urinary metanephrines, which prompted her surgical referral. CT scan demonstrated a right adrenal mass measuring 1.7 cm and a left adrenal mass measuring 1.5 cm.

Preoperative outpatient preparation included the administration of doxazosin, which was initiated at 1 mg orally twice daily, and was gradually increased to 3 mg orally twice daily. Propranolol 20 mg orally once daily was then initiated. A general anesthetic was performed. Fentanyl 100 mcg, lidocaine 80 mg, propofol 200 mg, and succinylcholine 120 mg were utilized for induction of general anesthesia and facilitation of endotracheal intubation. An arterial line was then placed, and a second IV. Sevoflurane and a mixture of oxygen and air was used for maintenance, as well as a clevidipine infusion, phenylephrine infusion, rocuronium, 50 mg hydrocortisone, 25 mg ephedrine, 1 mg haloperidol, 4 mg ondansetron, 1 unit vasopressin, and additional 150 mcg of fentanyl, 1 liter of 5% albumin, and 1650 ml of lactated Ringer's solution. Hemodynamically she was relatively stable. Urine output was 300 ml, and the estimated blood loss was 50 ml. Anesthetic time was 3 hours and 52 minutes. Surgical time was 2 hours and 21 minutes. Given her postoperative primary adrenal insufficiency, Hydrocortisone 30 mg orally each morning and 20 mg midday was started for 3 days. She then started Fludrocortisone 0.1 mg orally every day.

MEN2B is a very rare, complex disease that requires a multidisciplinary approach to the patient, early diagnosis and treatment, and meticulous perioperative management. Patients with MEN2B who have undergone bilateral adrenalectomy for pheochromocytoma will need daily adrenal replacement therapy and additional doses if they are ill to avoid an adrenal insufficiency crisis.



Abstract #17

Secondary Hemophagocytic Lymphohistiocytosis with Associated Central Pontine Myelinolysis: A Case Report

Philip, Rachel OMS-III*¹, Alam, Mariam OMS-III¹, Quach, Shanon DO ²

*Corresponding Author: rachel.philip@co.rvu.edu

- (1) Affiliation 1: Rocky Vista University COM, Parker, CO
- (2) Affiliation 2: Sky Ridge Medical Center, Lone Tree, CO

Hemophagocytic lymphohistiocytosis (HLH) is a serious condition characterized by uncontrolled immune system activation, often presenting with fever, hepatosplenomegaly, and cytopenia. The clinical picture can vary significantly among patients and can be primary; caused by genetic mutations in children, or secondary; triggered by viral infections, autoimmune diseases, or malignancies in adults. Rapid recognition and treatment are essential due to the potential for swift progression to multiple organ failure. This case discusses secondary HLH in an adult patient with an underlying Epstein-Barr virus (EBV) infection and the rare complication of central pontine myelinolysis.

A 34-year-old previously healthy male presented to the emergency department with an altered mental state and unexplained intermittent fevers persisting for three weeks. He was initially treated for an ear infection with amoxicillin/clavulanic acid. As his condition deteriorated, additional symptoms emerged, including bilateral ear pain, fever, and diffuse headaches. Notably, the patient had a history of methamphetamine and cocaine use and lived on a farm without recent sick contacts. Initial evaluations revealed acute hepatic encephalopathy, mastoiditis, and pancytopenia. Further diagnostic tests uncovered hepatosplenomegaly, lymphadenopathy, and reactivated EBV.

The patient met six of the eight HLH criteria, including fever above 38.3°C, splenomegaly, cytopenia, elevated triglyceride and ferritin levels, and a bone marrow biopsy confirming hemophagocytosis. The treatment plan followed the HLH-2004 protocol, involving an eightweek induction therapy using etoposide (VP-16), dexamethasone, and cyclosporine. Monitoring of disease-specific markers such as ferritin and IL-2R showed improvement.

One month later, Magnetic resonance imaging (MRI) showed abnormal signals in the central pons, consistent with central pontine myelinolysis. Lumbar puncture findings included pleocytosis, elevated total protein, and a substantial EBV viral load, indicative of progressive CNS-HLH with persistent EBV reactivation. The patient was matched for allogenic hematopoietic stem cell transplant (HSCT). However, the patient continued to deteriorate and eventually required emergent intubation. Shortly after, he suffered a cardiac arrest and passed despite resuscitative efforts.



Abstract #18

CONTINUOUS EDUCATIONAL OUTREACH INITIATIVES TO RURAL HIGH SCHOOLS AND THE LASTING IMPACT ON STUDENTS' ATTITUDE TOWARD A CAREER IN HEALTHCARE

Meagan Crouse, OMSII^{1*}; Rebecca Bolen, OMSII^{1*}; Logan Shouse, OMSII^{1*}; Jerrica Dennis,

OMSII^{1*}; Mark Payton, PhD, MS²; David Ross, DO³

Corresponding Author: <u>Meagan.crouse@co.rvu.edu</u>

*Equal Contribution Authors

(1) Affiliation 1: Rocky Vista University, Englewood, CO

(2) Affiliation 2: Department of Biomedical Science, Rocky Vista University, Englewood, CO

(3) Affiliation 3: Rural and Wilderness Medicine Track, Rocky Vista University, Englewood, CO

Rural communities often face significant challenges in attracting and retaining healthcare professionals. By encouraging students from these communities to consider healthcare careers, we increase the likelihood that they will return to their hometowns to practice medicine, improving access (Feldman et al). A previous study conducted in 2020 analyzed the effects of a single educational workshop at a rural high school in New Hampshire (Dunn et al). The results suggested that students had a better understanding of the medical field. The aim of our study is to analyze how continuous educational outreach initiatives affect rural high school students' attitudes towards a career in healthcare. By providing recurrent questionnaires alongside a presentation series, we can analyze if our impact is being met.

Data collection took place at a rural high school over four sessions and spaced approximately one month apart. During each session, a 20-minute presentation was given on various healthcare topics. Presentations outlined frequently seen conditions, medical personnel involved in the care of those conditions, daily roles, education path of each of those medical personnel, and clinical case presentations. Immediately before and after each presentation, participants completed a voluntary survey assessing their interest in healthcare through Likert Scale questions.

Likert scale questions from before and after the presentation series indicated a significant increase in interest in a career in healthcare and the likelihood of going into a career in healthcare (p < 0.0329, p < 0.0437). This data shows that through our continuous educational outreach, we have increased interest and heightened likelihood of pursuing a healthcare care. This supports future endeavors to bring healthcare series to rural high schools, ultimately in efforts of increasing the rural healthcare workforce in the future. Limitations of our study include a small, fluctuating sample size and data from one rural high school.



Abstract #19

Rising Endemic Leishmaniasis Cases in United States and Exposing the Vital Role of Healthcare Providers in Awareness and Management

Mia Panlilio BA¹, Olnita Martini MS¹, Elizabeth Tchernogrova BA², Alexa Carboni BS¹, Danielle Duffle MS¹, Leslie Torgerson MD¹

*Corresponding Author: mia.panlilio@co.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA
- (2) Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA

Leishmaniasis, a parasitic infection transmitted by sandflies, has been historically viewed as a travel-related disease in the United States. Recent evidence indicates its emergence as an endemic threat, particularly in states such as Texas and Oklahoma, necessitating reevaluation of its status and management within United States healthcare systems. This paper highlights the increasing incidence of Leishmaniasis cases in the United States, underscoring the need for heightened awareness among healthcare providers regarding its diagnosis and prevention. Here, we review the disease's clinical manifestations, ranging from cutaneous lesions to severe systemic involvement, emphasizing the importance of considering Leishmaniasis as a differential diagnosis, especially for patients presenting with compatible symptoms and residing in or having exposure to endemic regions. Factors such as climate change and the movement of animal reservoirs are discussed as contributing factors of the disease's spread and increasing endemicity.

Ultimately, this paper calls for comprehensive screening strategies including clinical assessments, detailed travel and exposure histories, and appropriate laboratory testing. It further outlines treatment options while stressing the significance of early detection and initiation of therapy to prevent complications of disease. This paper advocates for preventative measures including avoidance of sandfly habitats, use of insect repellents, protective clothing, and the collaborative effort with public health advocates to mitigate its spread. As climate change continues to influence vector distribution and disease incidence, Texas and other states may face an increased burden of endemic Leishmaniasis, urging for a protective response from the medical community to prevent wider spread and ensure timely intervention.



Abstract #20

RECTAL SYPHILIS: A DIAGNOSTIC CHALLENGE

Nathan Huber MS OMS-III (*1), Matthew Seto, DO (2)

*Nathan Huber: Nathan.huber@co.rvu.

- (1) Rocky Vista University, Parker, CO
- (2) Gastroenterology of the Rockies, Lakewood, CO

Syphilis, colloquially known as "the great imitator," is an infectious disease characterized by several distinct clinical presentations. Rectal syphilis poses a diagnostic challenge, as it can mimic many rectal pathologies endoscopically and radiographically, presenting clinical complexities. A similar case reported in the literature underscored this challenge, emphasizing the importance of an exhaustive diagnostic workup to prevent unnecessary colorectal surgery upon establishing a diagnosis of rectal syphilis.

This case report presents a 45-year-old heterosexual male with an established diagnosis of HIV being effectively managed with a multidrug regimen who presented with a complaint of two weeks of hematochezia and obstructive bowel symptoms. The physical exam was non-revealing. An initial diagnosis of internal hemorrhoids was made but he was referred for further investigation. Colonoscopy and histopathology yielded non-diagnostic results but revealed rectal ulceration and a predominance of plasma cell inflammation. Subsequently, the patient developed a maculopapular rash on his trunk and extremities, prompting a workup for syphilis.

Immunohistochemistry (IHC) for syphilis returned positive and was further confirmed by treponema antibody testing (FTA-ABS). Treatment with Penicillin G 2.4 million units intramuscularly (IM) was initiated, leading to a downtrend in rapid plasma reagin (RPR) results over six months. However, the patient was subsequently lost to follow-up.

This case underscores the importance for physicians to be vigilant regarding this condition, given its potential for clinical and endoscopic misdiagnosis. While rectal syphilis is rare, the increasing incidence of syphilis diagnoses in recent years necessitates prompt recognition to prevent unnecessary morbidity resulting from delayed or inappropriate treatment.



Abstract 21

Case Series: Postural Orthostatic Tachycardia Syndrome (POTS) as an Adverse Event to Human Papilloma Virus (HPV) Vaccine and its Relationship to Ehlers Danlos Syndrome

Nicole Schipperijn*¹, Megan Wijesinghe 2², Ben Brooks, PhD 3^{1,2}

- $*Corresponding\ Author:\ Nicole. Schipperijn @co.rvu.edu$
- (1) College of Osteopathic Medicine, Rocky Vista University, Parker, CO
- (2) College of Osteopathic Medicine, Rocky Vista University, Parker, CO
- (3) College of Osteopathic Medicine, Rocky Vista University, Ivins, UT

Introduction: Gardasil 9, Human Papilloma Virus (HPV) vaccine, first approved for use in 2014. The vaccine has been shown to protect against various cancers, including cervical cancer. While generally well-tolerated, common side effects include injection site pain, fever, headaches, and muscle aches. However, in some cases, patients have reported the severe complication of postural orthostatic tachycardia syndrome (POTS) following the vaccination. A strong association between POTS and Ehlers-Danlos Syndrome Type III (EDS) exists, with approximately eighty percent of patients diagnosed with EDS also exhibiting symptoms of POTS. Given the gravity of this potential side effect, healthcare providers must recognize and appreciate the association between HPV vaccinations and POTS and EDS. This awareness can ensure the safety and well-being of patients receiving the vaccine.

Case Presentations: A 42-year-old female received the Gardasil 4 vaccine in January 2014. Past medical history is significant for EDS type III diagnosed in 2010 with a Beighton score of 7 out of 9. Shortly after administration of Gardasil 4, the patient experienced symptoms of POTS, specifically syncope and tachycardia. While the patient began experiencing symptoms of POTS in 2014, it took several doctor consultations before a table tilt test was performed. This resulted in a diagnosis not being made until 2021. A 17-year-old female received the Gardasil 9 vaccine in 2021. Shortly after receiving the vaccine, the patient experienced POTS symptoms. After three years of several doctor consultations, the patient received a table tilt test and was diagnosed with POTS. Additionally, the patient also started demonstrating signs of hypermobility and was diagnosed with EDS type III in 2024. In both cases, adverse events from HPV vaccinations have severely impacted the patient's daily life.

Discussion: These cases emphasize the importance of physician awareness regarding the association between POTS and EDS Type III in patients receiving the HPV vaccine. When patients exhibit POTS symptoms post-vaccination, healthcare providers should consider evaluating them for EDS Type III. Prompt recognition of POTS signs and symptoms, coupled with early testing, is crucial. Expedited diagnosis of POTS following the first onset of symptoms can limit further complications and improve patient quality of life.



Abstract #23

Impact of Telehealth on Screening and Longitudinal Glaucoma Management: A Literature Review

Raechel McDaniel, OMS-II,1,* Tiffany Nguyen, MS, OMS-II,1 Alicia DuPont, OMS-II, 1 Qamrul G. Choudhury, PhD, MS1

1Rocky Vista University College of Medicine, Parker, CO, United States

This systematic review focuses on understanding the rising use of telehealth within the field of ophthalmology for glaucoma management.

Evaluating methods of remote glaucoma management can help physicians better understand emerging technologies and decide whether to implement them in their own practice, to reach underserved populations especially.

The review was prospectively registered in PROSPERO (ID CRD42024524228). A search was performed on PubMed and Scopus databases with the input ((Glaucoma) AND (telehealth)). The search identified 238 papers and duplicates between databases were excluded. A quick screen was performed with the following inclusion criteria: written in English, took place in United States, adult population. Then, papers were retrieved and reviewed by the team to compare them to the inclusion/exclusion criteria with the principal investigator overseeing the process. The inclusion criteria checked at this step was glaucoma, telehealth, English language, and adult population in the United States. The exclusion criteria checked at this step was pediatric population and studies taking place outside of the United States. After the researchers evaluated the articles, the end of this search lead to 52 qualified papers.

Telehealth can successfully be used in glaucoma management, however there is above average patient education involved with implementation of this technology. The articles discussed showed promise, at the very least, with the use of telehealth in conjunction with regular inoffice visits for the management of glaucoma. Aspects of promising management were screening, visual acuity, and intraocular pressure checks.

Further trials of implementation need to be investigated moving forward to be able to understand physician use and views on telehealth to properly care for glaucoma patients. More attention also needs to be focused on bringing medical equipment, internet access, and insurance coverage to lower socioeconomic patients for telehealth to be trialed in a wider range of communities.



^{*} Corresponding author: raechel.mcdaniel@co.rvu.edu

Abstract #24

Understanding How Race-Based Medicine Perpetuates Inequity

Sonia Abraham, OMS-III*¹, Phillip Khong, OMS-III¹, Daniel Kramer, DO¹
*Corresponding Author: sonia.abraham@co.rvu.edu
(1) Affiliation 1: Rocky Vista University College of Osteopathic Medicine, Parker, CO

The use of race in clinical decision-making has gained increased attention in recent years, sparked by racial disparities in healthcare outcomes and the recognition that race is a social construct, not a biological one. A comprehensive literature review was conducted using the key phrases "race based medicine", "hydralazine Black patients", "hypertension Black patients" on the database PubMed. The inclusion criteria were clinical trials and peer-reviewed publications that were published after 2020 with a focus on race-based medicine and hydralazine and hypertension treatment in Black patients. The exclusion criteria were non-peer-reviewed publications and undefined criteria of race categories in data analysis of peer-reviewed publications. The findings reveal that race is frequently used as a factor in various clinical tools, such as the estimated glomerular filtration rate (eGFR) equation and the vaginal birth after Cesarean section (VBAC) calculator, often lacking strong scientific evidence to support its inclusion. The reliance on race in these tools can lead to negative health outcomes for minority patients, such as delayed referrals for kidney transplants in Black patients due to the use of race in the eGFR equation. Additionally, the marketing of BiDil as a heart failure medication specifically for African Americans demonstrates how race-based medicine can be driven by corporate interests rather than scientific evidence. The use of race in clinical decision-making can also reinforce the false notion that race is a biological construct and distract clinicians from addressing social determinants of health and implicit biases that contribute to healthcare disparities. This research highlights the need to re-evaluate the use of race in clinical algorithms and guidelines and contributes to the growing body of evidence calling for a shift towards more individualized and biologically sound approaches to healthcare. However, it is important to acknowledge the limitations of this study, which primarily relies on a literature review. Further research is needed to directly assess the impact of race-based medicine on patient outcomes and to develop and validate alternative approaches that promote health equity. By demonstrating how race-based medicine perpetuates inequity, this work advances knowledge in the field and emphasizes the critical need for change in clinical practice.



Abstract #25

Investigating the Impact of Breathwork on Medical Student Performance

Kelly Dinh², Sydney Klumb*¹, Lauren Weber², Katelyn Bercaw², Ashley Rousseau¹, Leslie Torgerson, MD¹

*Corresponding Author: Sydney.Klumb@co.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO
- (2) Rocky Vista University College of Osteopathic Medicine, Ivins, UT

Mental health continues to be a problem in the medical community. Compared to other professional colleagues, medical students are found to experience higher levels of stress, which interferes with cognitive function and performance, and contributes to additional health and psychological difficulties. Implementing stress management techniques can mitigate and prevent these long-lasting negative impacts. One such technique, breathwork, is shown to lower heart rate, resulting in a decreased physiologic measure of stress. Studies involving nurses and anesthesiology residents show a positive correlation between breathwork and performance, yet there has not been a similar study in medical students. Box breathing is hypothesized to be an important, sustainable tool in improving performance and reducing perceived stress levels for medical students. This study plans to analyze the impact of breathwork implementation amongst first-year medical students by measuring stress levels via heart rate and analyzing performance through test scores and simulated medical emergencies. 50 students will be randomly assigned and blinded to control or breathwork groups. Students must not have started a new prescription within the last 60 days for antipsychotic, antidepressant, and/or anti-anxiety agents. To establish a baseline, both groups will complete Generalized Anxiety Disorder 7 (GAD-7), Perceived Stress Scale, and Big Five Personality assessments. To measure performance, both groups will complete a written examination consisting of board-style questions and a virtual Oxford simulation on seizures. The control group will review board preparation materials before the examination, while the breathwork group will complete a box breathing guided exercise during that same period. Immediately before and after implementation of the provided tools, both groups will complete a Visual Analogue Scale (VAS) Stress assessment and have their heart rate measured via pulse oximeters. With the intention of direct comparison of both groups, results are expected to demonstrate increased performance scores for the breathwork group compared to the control. Additionally, results may include a decreased VAS Stress score and decreased heart rate for those who participated in the breathwork exercise. Limitations of this study include the smaller sample size, and the incoming knowledge and previous experience of individual participants in board-style exams and clinical simulations.



Abstract 26

Transcatheter Closure of the Gerbode Type Ventricular Septal Defect After Redo Mitral Valve Replacement

Tara Talebi-Talghian, OMS III*¹, Cihan Cevik, MD², Timothy William Hegeman, DO³, Peter Lee Walinsky, MD⁴

*Corresponding Author: Tara.Talebi-Talghian@co.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO
- (2) Department of Cardiology, Memorial Hospital Central, Colorado Springs, CO
- (3) Department of Cardiology, Memorial Hospital Central, Colorado Springs, CO
- (4) Department of Cardiac Surgery, Memorial Hospital Central, Colorado Springs, CO

Gerbode defect is an uncommon ventricular septal defect resulting in a left ventricle to right atrium shunt. Usually congenital in origin, acquired defects have been reported following infective endocarditis, cardiac surgery, trauma, or acute myocardial infarction. This condition causes left-to-right intracardiac shunt and potential hemodynamic instability. The complicated anatomy poses therapeutic challenges, and management is unclear. We present a case of acquired Gerbode defect following redo mitral valve replacement surgery in a 71-year-old male who developed severe dyspnea and pulmonary hypertension. After initial valve replacement seven years prior and subsequent redo surgery due to progressive mitral stenosis, the patient's symptoms persisted. Detailed imaging with echocardiogram and heart catheterization revealed a large 7.5 x 6.4 mm Gerbode defect. Given the patient's surgical history and the high risk associated with further sternotomy, a percutaneous transcatheter ventricular septal defect closure was performed using a 12 mm Amplatzer duct occluder. This intervention successfully alleviated symptoms and normalized hemodynamic parameters. We emphasize the critical importance of recognizing Gerbode defects in postoperative patients, showcasing the effectiveness of transcatheter closure in symptom reduction and avoiding the complications associated with highrisk repeat cardiac surgeries. By detailing the procedural strategy and successful postoperative outcomes, this report contributes valuable insights to the existing literature, potentially shaping future treatment protocols for similar cases. Transcatheter repair, which offers shorter recovery times, reduced pain, and the elimination of repeat sternotomy, positions it as a preferred, minimally invasive alternative for managing acquired Gerbode defects.



Abstract #27

Improving Resident Physician Interprofessional Collaborative Practice During Bedside Interdisciplinary Rounds

Thomas Andreas MS OMS-III*¹, Katarzyna Mastalerz MD², Benjamin Brooks PhD MBA¹ *Corresponding Author: thomas.andreas@rvu.edu

(1) Affiliation 1: Rocky Vista University COM, Parker, CO

(2) Affiliation 2: Division of Hospital Medicine, University of Colorado COM, Aurora, CO

Modern healthcare is delivered by complex interprofessional teams and healthcare providers that requires strong communication and teamwork skills to maintain effectiveness, without these skills, high rates of medical errors and patient harm will remain prevalent. Interprofessional education (IPE) has emerged to combat this issue by providing guidance in improving interprofessional collaborative practice (IPCP). Through the implementation of bedside interdisciplinary rounds (IDR) and daily feedback of resident behaviors, we evaluated the efficacy of IDR as the model vehicle for improving the delivery of IPE within the hospital setting. This model could allow for early improvements of IPCP that can be used to improve teamwork skills amongst care teams.

We conducted a pre-post comparison study of bedside IDR teamwork behaviors of resident physicians at the beginning and at the end of a four-week internal medicine rotation at Presbyterian St. Luke's Medical Center between July 2017 and May 2018. We enrolled only internal medicine residents and first year transitional year residents, only including those in their intern and third years of training, n=82.

Behaviors were based on Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) framework which assesses teamwork skills in communication, leadership, situational monitoring, and mutual support. Observed behaviors were documented, scored, and blinded from participants, while supervising physicians conveyed daily feedback to residents.

Residents performed 54% of the predetermined behaviors at the beginning and 60% at the end of their rotation (p < 0.001), indicating a consistent increase of at least one behavior per individual by the end of the rotation. Notably improved behaviors included: inviting cross checks, proposing daily pans, avoiding medical jargon, and asking permission to enter patient rooms (p < 0.05). Limitations included: observers of behaviors were not blinded to pre and post periods, non-standardization of feedback from attendings, and observations occurred in one clinical care setting.

Our results indicated that the intentional use of IDR as a tool to deliver IPE did result in an improvement in IPCP amongst residents. The use of intentional interprofessional work and explicit teamwork teaching are likely to increase opportunities for IPE to become successful.



Abstract #28

SPIRITUAL PRACTICES AND HEALTH OUTCOMES: THE SPIRITUAL HISTORY

Vanessa Johnson OMS-II, Kayla L. West OMS-II, Hanna I. Lee OMS-II, James M. Small MD PhD

Corresponding Author: James M. Small, jsmall@rvu.edu

Rocky Vista University, College of Osteopathic Medicine, Parker, Colorado USA

The first Tenet of Osteopathic Medicine states that "The body is a unit; the person is the unit of body, mind, and spirit." Numerous modern investigations confirm associations of the importance of spirituality in serious illness, all-cause mortality, health behaviors, mental health, quality of life, suicide risk, and other positive outcomes. Equally important, some forms of spiritual struggle have been associated with worse health outcomes. Overall, physicians who acknowledge patient spirituality and religion have improved treatment outcomes and patient satisfaction. Unfortunately, medical schools are failing to implement and promote structured methods for student doctors' edification regarding the topic of faith and religion. This article aims to summarize current research regarding patient outcomes when religion is addressed. The first step of this investigation will begin with a literature review of the Spiritual History in healthcare and medical education using the following keywords: "(spirituality OR faith OR religion) AND health AND patient outcomes. Inclusion criteria includes articles written in English, articles written within the last 10 years, and articles that report patient outcomes related to spirituality, faith, or religion. Exclusion criteria includes non-research articles such as editorials, commentaries, letters, and reviews and studies with insufficient data or methodology description. Consistent with prior literature, the results suggest positive outcomes in patients where religious practices and preferences are addressed during a doctor's appointment. Limitations in this study include the quality of the given studies likely show selection bias and generalization about all patients wanting a spiritual background in their primary care visit. Given the overwhelming amount of evidence regarding this practice, medical schools should aim to implement a more structured approach to educating future physicians using a mind, body, and spiritual approach to further advance healthcare practices.



Abstract # 29

Evaluation of High Risk Dietary and Environmental Factors Preceding Migraine Onset: A Comparative Analysis of Self-Reported Triggers Using a Mobile Tracking App Migraine Insight

Chistina Wornom OMS-1^{1*}, Brooklyn Brekke OMS-1^{1*}, Tavsimran Luthra MS-4³, Kelsey O.Neill³, Lynn Smith², Jane Harrington, PhD¹

*Corresponding Author: christy.wornom@mt.rvu.edu, brooklyn.brekke@mt.rvu.edu

- (1) Rocky Vista University Montana College of Osteopathic Medicine (Billings, MT)
- (2) Migraine Insight App
- (3) St. Georges University School of Medicine, Tue Blue Campus, (St. George, Grenada, West Indies)

Migraines are a significant health concern for millions of patients who are reliant on habitual tracking of event triggers, to reduce or predict episodes. Many migraine triggers have been recognized including environmental and food triggers. While a vast group of migraine triggers have been recognized, the frequency of migraine occurrence after a known trigger is mostly unknown. Migraine Insight is an app that facilitates daily logging to determine individualized patterns of events preceding migraine onset quantitatively. To investigate patterns for reported migraine triggers, user data of the Migraine Insight app were evaluated and sorted to give insight into common migraine triggers and frequency of migraine occurrence.

A preliminary keyword list including food, light, stress, noise, sleep, caffeine, weather, wine, and beer was assessed from a raw data set of 2605 data entries extracted from migraine insight during 30 days between September 19 to October 18, 2021, to identify high ranking self-reported events, classified by dietary, environmental, body physiology and medications. Association between migraine onset after consumption of the top 5 dietary products was evaluated to establish the frequency of migraine episodes for all users who reported the items.

Collectively, food and beverage (n=353, n= 252) totaled the highest reported entries, with chocolate, wine, tea, coffee, and cheese as the highest-ranked foods for prevalence of reporting across all users and for frequency of migraine onset for users who consumed the items within 48-hours. The four highest non-food entries were altered sleep patterns (n=245), stress or anxiety (n=199), rain or storm conditions (n=192), and bright light or brightness (n=191).

High-risk foods, environmental conditions, stress, and lighting with the highest prevalence reporting have previously been reported in medical literature, implicating that a migraine tracking app is a valid alternative to paper-based diaries. The study's reliance on self-reported data and the self-selecting nature of the participant pool must be acknowledged as limitations. These factors could introduce bias and affect the generalizability of the findings, as each individual's triggers and responses are unique.



Abstract #30

Exploring an Anatomical Variation of the Cephalic Vein: Implications for Physiological Function and Surgical Outcomes

Cole Eastep (OMS-1) ¹, Cindy Funk (Ph.D.) ²

*Corresponding Author: Cole.eastep@mt.rvu.edu

In surgical practice, the precise implantation of Cardiac Implantable Electronic Devices (CIED), starting central lines, and several other procedures can rely heavily on the cephalic vein's typical anatomy. However, deviations from this norm, as uncovered in this cadaveric case report, can yield unexpected clinical findings. This report spotlights a unique anatomical variation—an anomaly characterized by its superficial course and connection to the external jugular vein. While vascular variations aren't uncommon, this variant's rarity and potential impact on surgical procedures are significant.

Through meticulous examination of cadaveric specimens this variant was discovered in one donor of the ten available. High-resolution photographs were methodically taken to document the cephalic vein's anatomy and its connections. Photographs were taken from two 77-year-old females and a 70-year-old male. In this instance, the cephalic vein took an atypical route, forming anastomoses with the external jugular vein.

The abnormal supraclavicular cephalic vein anatomy, documented in 2-5% of cases, presents various variations, such as anastomoses with the external jugular vein. Exploring the embryological origins of the persistent supraclavicular cephalic vein provides insights into evolutionary biology, reflecting an atavistic feature seen in lower vertebrates. This sheds light on the reversed development of jugular veins in higher vertebrates like primates, offering valuable clues to vascular development.

Such anatomical variations underscore the importance of detailed preoperative planning in surgical procedures involving the cephalic vein. Understanding these variations is crucial for safe device placement and surgery. This case also highlights the need for alternative diagnostic and treatment strategies, urging surgeons to adapt their approach in abnormal cases.

Thorough anatomical investigations in medical education bolster surgeons' readiness for encountering such variations, thereby enhancing patient safety and outcomes. Future research endeavors may further refine surgical techniques, ultimately advancing the field of surgical practice.



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¹ Doctor of Osteopathic Medicine Post Graduate Program, Rocky Vista University Montana College of Osteopathic Medicine, Billings, MT

² Department of Biomedical Sciences, Rocky Vista University Montana College of Osteopathic Medicine, Billings, MT

Abstract #31

Impact of Osteopathic Clinical Skills (OCS) Tutor Content on RVU-MCOM First-Year Medical Students' Academic Performance

Isaac Hartman MS OMS-IV*1, Karma McKelvey PhD MPH2

*Corresponding Author: isaac.hartman@rvu.edu

- (1) Affiliation 1: Osteopathic Teaching Fellow, Rocky Vista University-Montana College of Osteopathic Medicine (RVU-MCOM), Billings, MT
- (2) Affiliation 2: Assistant Director for Research & Scholarly Activity, RVU-MCOM, Billings, MT

The inaugural Osteopathic Teaching Fellow created the Osteopathic Clinical Skills (OCS) I/II tutor materials to support RVU-MCOM OMS-I in preparing for their OCS assessments. No tutors were assigned from the other RVU campuses to fill this role as RVU-MCOM is a new program, and OCS is a new curriculum course. All tutor content was created by the fellow.

To establish a benchmark and investigate the importance of Osteopathic Teaching Fellows at RVU-MCOM, we assessed the usability and impact of the content as a proxy. We measured usage rates, perceived impact on assessment scores, whether or not the students honored OCS I and satisfaction with the content. This data was collected with an anonymous paper and pencil/pen survey.

Among the inaugural class of RVU-MCOM students (n = 77), frequency, proportions, and means (SD), as appropriate, were calculated. Significance testing was conducted using Chi² for the difference of proportion. These results were then compared between those who used (vs. those who did not use) the OCS tutor content.

Of the respondents (n = 57), 69% (n = 38) honored OCS I vs. 60% (n = 46) of the RVU-MCOM OMS-I (n = 77). With n = 1 respondent indicating no use of the tutor materials, the difference in impact between users (vs. nonusers) cannot be determined. Outcomes of interest did not differ by sex (p-values > 0.26). Of the respondents (n = 51), 84% (n = 43) reported overall satisfaction of 8 (out of 10) or higher. 94% (n = 47) of the respondents (n = 50) reported that use of the tutor content resulted in improved academic performance on their OCS assessments.

In conclusion, the vast majority of OMS-I found the tutor content was effectively delivered and positively impacted their OCS academic performance, as seen by the overwhelmingly positive written feedback collected. The usability and acceptability of the materials have been proven for this RVU-MCOM class.



Abstract #32

Influence of the Myers-Briggs Type Indicator on Physiological Response to Undergraduate Medical Education (UME) Exam Environments: Dichotomy of Extraversion vs Introversion

Jacquelyn Waller, PharmD, BCPS *1, Mackenzie Jackson, MMS Candidate², Sydnee Martinez, MMS candidate², Tori Misiaszek, MMS candidate², Joshua Soriano MMS candidate² *Corresponding Author: jwaller@rvu.edu

- (1) Department of Preclinical Education, Rocky Vista University Montana College of Osteopathic Medicine, Billings, Montana
- (2) Master of Medical Science, Rocky Vista University Montana College of Osteopathic Medicine, Billings, Montana

Medical students experience significant stress, negatively impacting their cardiovascular health. Although the Myers-Briggs Type Indicator (MBTI) is utilized in Undergraduate Medical Education (UME) admissions processes, residency interviews, and curricular reform to improve student well-being, the correlation between physiological stress and MBTI Introversion (I) and Extraversion (E) dichotomies has not been explored. Researchers questioned, 'Is MBTI, E vs. I dichotomy, correlated to changes in resting heart rate (RHR), heart rate variability (HRV), and stress score (SS) in first-year osteopathic medical students in a testing environment?'.

The purpose of this study was to characterize the correlation of gender, personality type, and physiological response to stress in a medical school testing environment. Researchers hypothesized that Extraverts and Introverts would experience similar changes in RHR, HRV, and SS leading up to, during, and after a medical school examination.

This study included twenty subjects who completed the MBTI, wore a Fitbit Inspire 3 (wearable heart rate monitor) throughout the study period, and completed Post Exam Surveys. Participants with a diagnosed heart condition, testing accommodation, or prescription for a disqualifying medication were excluded. Baseline RHR, HRV, and SS was calculated by the device. Data was then monitored for six weeks, and biometric trends were analyzed based on the participant's gender and E vs. I MBTI dichotomy. Data within three days before, the day of, and the day following an exam were used to statistically analyze stress around examinations and its impact on biometric markers.

Researchers intend to use data obtained in this pilot study to guide future research by determining differences in personality types and an individual's ability to tolerate stress. Therefore, these results will help medical educators better understand stress within the testing environment and inspire data informed, personalized changes in UME for personality types; therefore, decreasing stress in medical education and physician burnout in the future.



Abstract #33

CN XII VARIABILITY IN MEDICAL EDUCATION

Stiglich, A¹; Schwartz, A¹; Vaudrey, K. PhD²; Donohue, M. L. PhD²

*Corresponding Author: <u>mdonohue@rvu.edu</u>
(1) Affiliation 1: Burrell COM, Las Cruces, NM

(2) Affiliation 2: Rocky Vista University Montana COM, Billings, MT

A lack of consistency exists in educating osteopathic medical students on the upper motor neuron (UMN) pathway of the hypoglossal nerve (CN XII) and potential clinical outcomes following UMN lesions of the pathway. Cortical fibers of CN XII are often described as descending contralaterally to the hypoglossal nucleus in the medulla where lower motor neurons emerge to innervate ipsilateral tongue muscles. A literature review found four distinct pathways described that could result in variable clinical presentations. This variability demonstrates a need for standardizing neuroanatomy curricula available to osteopathic medical students.

Pathway Sample: Thirty-one course syllabi were collected from osteopathic medical schools in the United States. Required/recommended texts were evaluated, generating a list of 27 neuroanatomy textbooks that describe the CN XII UMN pathway.

Board Prep Sample: Twenty-nine United States Medical Licensing Exam (USMLE) Step 1 Board books were compiled from six "Best USMLE Best Board Prep Resources' websites, including 21 general and 8 neurology-specific preparatory books.

Most books in the *Pathway Sample* (n=12) describe a contralateral pathway of UMN CN XII fibers. Of 31 syllabi, 19 had textbooks on their syllabi that described non-exclusively contralateral pathways. In the *Board Prep Sample*, eight USMLE prep books described exclusively contralateral control/tongue deviation with an UMN lesion. Four books included some references to variability, including one that specified contralateral deficit results from paralysis of genioglossus. Two books specified variability in the pathway/tongue deviation. The fourth book referenced variability but further described only contralateral control in one section and "predominantly" contralateral innervation in a later section.

Four variations in the UMN pathway of CN XII are described in literature available to osteopathic medical students and have potentially variable clinical outcomes in event of a unilateral lesion.

Variations in description of UMN fibers to the hypoglossal nucleus demonstrates need for standardization in neuroanatomy curriculum of osteopathic medical schools and board review resources. Lack of standardization could further impact students' expectations for clinical experiences. Similar inconsistencies likely exist in allopathic curricula and should be evaluated in future studies.



Abstract #34

HUCKLEBERRIES AND GLYCEMIC REGULATION: EXPLORING POST-PRANDIAL GLUCOSE EXCURSIONS WHEN PAIRED WITH CARBOHYDRATES

Michael Cannone, MMS candidate¹; Trae Habel, MMS candidate¹; Jacquelyn Waller, PharmD, BCPS*²; Bianca McAravey, MMS candidate¹ *Corresponding Author: jwaller@rvu.edu

- (1) Master of Medical Sciences, Rocky Vista University Montana Campus, Billings, Montana
- (2) Department of Preclinical Education, Rocky Vista University Montana College of Osteopathic Medicine, Billings, Montana

Introduction: Carbohydrate-rich meals lead to post-prandial glucose spikes. Berries (*Vaccinium* species), rich in fiber and anthocyanins, regulate carbohydrate metabolism and reduce insulin resistance. Although available literature explores effects of berries on glycemic control, limited evidence is available documenting the effect of huckleberry consumption on blood glucose.

Objective/Purpose: This research seeks to advance knowledge about the role of diet in glucose regulation. Investigators hypothesize that the consumption of huckleberries with high-glycemic foods, such as bread, will result in a statistically significant decrease in post-prandial blood glucose levels.

Methods: This study included healthy adult participants aged 18-70 years (n=18). Participants attended three intervention days per cycle that included consumption of a positive control (huckleberries), a negative control (bread), and an experimental scenario (huckleberries with bread) on separate days. These interventions occurred over three cycles (nine days total) and were administered in a randomized sequence to enhance data accuracy. Capillary blood glucose measurements, taken before (pre-prandial, fasting) and after (post-prandial) interventions were measured 15, 30, and 60 minutes from the initial fasting measurement.

Results: Investigators predict that the outcomes of this study will provide insights into the potential positive impact huckleberries may have on post-prandial blood glucose levels.

Conclusion/Contribution to the Field: Overall, this research project contributes to a broader understanding of dietary effects on metabolic health and may offer valuable insights for individuals seeking to make informed nutritional choices, particularly people, in rural parts of the nation where huckleberries are commonly found, that are managing metabolic disorders such as type II diabetes.



Abstract #35

Assessing Utah Family Physicians' Confidence In Treating Psychiatric Conditions

Austin B White^{*1}, Andrew J Roush¹, Benjamin D Brooks, PhD^1 (Italicized. Make sure that every author has an affiliation)

*Corresponding Author: Austin.white2@rvu.edu

(1) Rocky Vista University College of Osteopathic Medicine, Ivins, Utah

The purpose of this study is to establish the level of comfort and knowledge of Utah family physicians in diagnosing and treating mental health concerns. An estimated 75% of outpatient primary care visits consist of a behavioral health component. Understanding how family physicians respond to these needs is crucial to identify areas in which training and resources should be directed.

This study took the form of a physician awareness survey directed towards family physicians in Utah. Responses were graded on a five-point Likert scale. For ease of comparison and statistical analysis, these responses were converted into numerical values from one to five.

Comparisons were made based on the type of degree (MD or DO) the physicians possessed, years of experience, and practice community. Comparisons were also made between how comfortable physicians were with diagnosing versus treating the same disorder. Additionally, comparisons were made between comfortability in initiating versus continuing a medication initially prescribed elsewhere.

It was anticipated that there would be no difference in the level of comfort of MD vs. DO physicians; and that physicians that had been practicing over fifteen years would be more comfortable with situations, diagnoses, and medications encountered less frequently in the primary care setting. Additionally, it was anticipated that providers in rural areas would be less comfortable only in area that were resource-dependent, but comparably comfortable compared to their suburban and urban counterparts.

Results demonstrated no significant difference between MDs or DOs. Between physicians practicing fifteen years or fewer and physicians practicing longer than fifteen years, there were no significant differences except in the initiation of one drug class, and the continuation of three drug classes.

The small number of responses makes it difficult to extrapolate these findings to Utah's family physician workforce. Future studies should put a priority on recruiting physicians practicing in rural settings. It is the opinion of the researchers that this is a promising initial exploration of this issue. Additional research is recommended to help identify areas to improve the access and quality of mental health care for Utahns.



Abstract #37

Title (Drug-Induced Hearing Loss)

Charlotte Mattson¹, OMSI, Nathan Olson¹, OMS II, Ysatis Ruiz¹ OMSII, Qing Zhong¹, MD, PhD *Corresponding Author: charlotte.mattson@ut.rvu.edu

(1) Affiliation (1): Pharmacology Department, Rocky Vista College of Osteopathic Medicine 255 E Center Street, Ivins, Utah 84738

Introduction and purpose:

Hearing loss is one presentation of ototoxicity and can be caused by many drugs. It is devastating, especially in children during language acquisition, in addition to long-term economic and social impacts. Intrauterine exposure to drugs such as aminoglycosides and loop diuretics can elicit a significant impact on the fetus causing hearing loss by the age of two. The purpose of this study is to summarize drugs that can induce hearing loss and explore the possible mechanism underlying this side effect.

Methods:

A literature search was performed using PUBMED, Google Scholar, and Cochrane Central Register for controlled trials. Keywords or phrases were "drug-induced ototoxicity", "treatments for ototoxicity", "mechanisms of action of ototoxic drugs", "ototoxic agents", "prevention of ototoxicity", and "Animal model of ototoxicity".

Results:

The top drugs inducing hearing loss include antimicrobials (aminoglycosides, vancomycin, amphotericin B, anti-malaria drugs), platinum and other anticancer drugs (cisplatin, methotrexate), loop diuretics, NSAIDs (nonsteroidal anti-inflammatory drugs), anti-hyperthyroid drugs, opioids, etc. The possible mechanisms are nerve demyelination, apoptosis via caspase cascade, glutamate toxicity, reactive oxidative species, inner ear hypoperfusion via vasculitis or vasoconstriction, ion disturbance on the background of gene mutations, and increased permeability of triggered drugs. If multiple trigger drugs are used simultaneously, the risk of hearing loss will be increased. In addition, if patients have sepsis, inflammations, or malnutrition, their risk is enhanced. Furthermore, the risk is present in drugs used topically. Intrauterine exposure to aminoglycosides and loop diuretics has been incriminated to cause hearing loss in children by age two.

Conclusions:

The current study will alert physicians of drug-induced hearing loss and the risk assessment for certain populations. Because hearing loss sometimes could be irreversible, therefore, avoiding the concomitant use of multiple triggered drugs should be recommended to reduce this side effect. Additionally, treatment with these drugs should start at the lowest dose. Finally, it is worth noting that there is a greater need for experiments and clinical trials to investigate the mechanism of drug-induced hearing loss and the strategies to prevent this side effect.



Abstract #38

Exploring the Role of Vitamin B12 in Acne Vulgaris and Potential Solutions Through Synthetic and Natural Supplements

Claudia Nguyen MSBS OMS-I*1, Colleen Moisa OMS-I1, Lynne G. Stephenson MSEd2

*Corresponding Author: <u>claudia.nguyen@ut.rvu.edu</u>

(1) Affiliation 1: Rocky Vista University COM, Ivins, UT

(2) Affiliation 2: Library Services, Rocky Vista University, Ivins, UT

Vitamin B12 (cobalamin) is crucial for brain function and blood cell health but has been linked to acne vulgaris due to its role in the production of proinflammatory porphyrins by *Propionibacterium acnes* (*P. acnes*). This bacterium, although important for skin defense, contributes to acne inflammation through porphyrin production using vitamin B12, often obtained from animal-based foods. Synthetic (cyanocobalamin) and natural (methylcobalamin) vitamin B12 supplements may be potential solutions for those suffering with acne vulgaris and unable to eliminate vitamin B12 from their diets. It is hypothesized that cyanocobalamin and methylcobalamin will exhibit distinct effects on the production of porphyrins by *P. acnes*, leading to the identification of the most effective form of vitamin B12 as an alternative treatment for acne vulgaris.

To assess the effects of the different vitamin B12 forms on porphyrin production, *P. acnes* will initially be cultivated in controlled laboratory conditions. The bacterial cultures will then be divided and supplemented with different concentrations of cyanocobalamin and methylcobalamin for two, eight, and fourteen days. Following supplementation, porphyrin levels will be extracted and quantified by a multimode microplate reader that utilizes fluorescence, absorbance, and glow luminescence. Finally, statistical analyses will be performed to interpret the collected data.

It is expected that methylcobalamin will yield lower levels of porphyrins compared to cyanocobalamin, making methylcobalamin a better alternative in the treatment of acne vulgaris. This is because methylcobalamin has lower absorption rates, limiting the amount of vitamin B12 available for *P. acnes* to produce proinflammatory porphyrins. The outcomes of this study would not only increase our understanding of the link between vitamin B12 and acne vulgaris, but also lay a foundation for the development of personalized acne treatment strategies and highlight the potential of methylcobalamin as a target and effective therapeutic option for further clinical exploration.



Unveiling TikTok's impact on rhinoplasty: advancement or adverse influence?

Abstract # 39

Colleen Moisa OMS-I*¹, Claudia Nguyen OMS-I¹, Lynne G. Stephenson MSEd ² *colleen.moisa@ut.rvu.edu

- (1) College of Medicine, Rocky Vista University (Ivins, UT)
- (2) Library Services, Rocky Vista University (Ivins, UT)

Trends in social media have the potential to influence a vast majority of viewers particularly when the underlying algorithm pushes a specific agenda. Without fact-checking mechanisms to prevent misinformation, products and procedures may be promoted to susceptible individuals. whose social media algorithms have assimilated such content. Such is the case with rhinoplasty. Therefore, it is important to analyze the types of content being presented and to understand the prospective patient's experience with TikTok and plastic surgery. We hypothesize that TikTok promotes rhinoplasty and extols the results rather than explaining the medical procedure and healing process. This research divulges how social media underplays the possible complications of rhinoplasty. Additionally, patients can better understand that social media may have limited medical knowledge.

After searching for "#Rhinoplasty" on TikTok the top 100 videos were evaluated using the DISCERN criteria. The DISCERN criteria is a 16-item questionnaire with 1–5-point ranking system that evaluates the integrity of the written content and can be applied to digital media¹. The results of the DISCERN score can be categorized as Excellent (63-75). Good (51-62), Fair (39-50), Poor (27-38), or Very Poor (15-26).

The research results affirmed the hypothesis since 57% of the videos scored in the Very Poor category. Specifically, the videos that scored in the Very Poor category promoted the transformation. It should be noted that many of these favorable videos were published by physicians showcasing their work.

Although TikTok and social media are not intended for educational purposes, but rather for entertainment. However, like other social media, users seek knowledge on TikTok, so it is important to analyze the content distributed to the public. According to the results, it illuminates the necessity of examining TikTok content related to rhinoplasty to bridge the gap in understanding the platform's impact on perceptions and knowledge regarding rhinoplasty.

TikTok videos are often created for entertainment or promotional purposes rather than to educate or inform. The public, including physicians, should be aware of the opportunities for misinformation, downplaying facts, or overpromising outcomes. As the study indicates, when seeking information regarding rhinoplasty procedures, prospective patients should avoid relying on TikTok as their sole source of information.



Abstract 40

Investigating Sexual Dysfunction in Patients on Isotretinoin, and Evaluating Patient Education Practices among Dermatologists: Survey Study

Elizabeth Tchernogorova¹, Eve Golden¹, Natalia Correa¹, Olnita Martini², Taylor M. Runion², Alyssa Quinn¹, Amanda Brooks PhD¹

Elizabeth.Tchernogorova@ut.rvu.edu

Background: Isotretinoin, a common treatment for severe cystic nodular acne, provides antiinflammatory effects and alleviates symptoms. Despite its efficacy, the medication has been linked to many well-documented side effects, including arthralgias, xerosis, and birth defects; however, it also introduces new contributions to sexual dysfunction, presenting opportunity for further research and patient education.

Objective: To elucidate the prevalence of sexual dysfunction symptoms among patients taking isotretinoin and examine the extent to which these patients received counseling on potential sexual dysfunction from their dermatologist.

Methods: This Institutional Review Board (IRB)-approved study (Protocol ID: 2023-127) was conducted by students affiliated with Rocky Vista University College of Osteopathic Medicine (RVUCOM) between November 29, 2023, and December 20, 2023. Students distributed a 14-question online survey addressing patients' personal adverse reactions to Isotretinoin (Appendix 1). The survey was distributed through email and social media platforms such as Facebook, Reddit and Instagram. The survey was conducted anonymously on Qualtrics, an online, password protected survey website. Participants completed an informed consent form before initiating the survey. Invitations to the study were then forwarded to individuals who met the inclusion criteria. Inclusion criteria included individuals over the age of 18 with past or present use of isotretinoin for acne. Exclusion criteria included incomplete surveys, informed consent, and participants under 18.

Limitations: Limitations include confounding factors of other medications such as oral contraceptive pills and selective serotonin reuptake inhibitors, underrepresentation of males in the study affecting the understanding of sexual dysfunction differences, and exclusion of 12–17-year age group, hindering a comprehensive assessment of isotretinoin's effects on sexual dysfunction.

Results: Patients were educated less frequently about the potential for sexual dysfunction associated with isotretinoin compared to other side effects.



¹ Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA

² Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA

Conclusion: This study demonstrates the opportunity for improved awareness and counseling on isotretinoin's impact on sexual health.



Abstract 41

Introduction to Investigating the Impact of Gua Sha Therapy on Cytokine Regulation

Elizabeth Tchernogorova BA*², Danielle Duffle MS¹, Nicole Skalka BS², Mary Tidwell BS², Olnita Martini MS¹, Iza Dziedzic BS²

*elizabeth.tchernogorova@ut.rvu.edu

- (1) Rocky Vista College of Osteopathic Medicine, Parker, CO, USA
- (2) Rocky Vista College of Osteopathic Medicine, Ivins, UT, USA

Elizabeth Tchernogorova BA*², Danielle Duffle MS¹, Nicole Skalka BS², Mary Tidwell BS², Olnita Martini MS¹, Iza Dziedzic BS²

Cytokines play a pivotal role in orchestrating immune responses and inflammation, making them attractive targets for therapeutic interventions. Gua Sha, an ancient East Asian therapy, has recently gained attention for its potential to modulate cytokine levels, offering promising anti-inflammatory effects. This study focuses on investigating the specific impact of Gua Sha therapy on cytokine regulation.

The central hypothesis posits that Gua Sha therapy induces a significant increase in cytokine production, subsequently leading to a pronounced anti-inflammatory response. This hypothesis is grounded in the mechanical stimulation of the skin characteristic of Gua Sha, triggering a cascade of biochemical events culminating in the release of various cytokines.

A comprehensive review of existing literature will be conducted to elucidate the underlying mechanisms through which Gua Sha influences cytokine regulation. Additionally, a study will be implemented to directly measure alterations in cytokine levels following Gua Sha therapy. Blood samples will be collected from participants pre- and post-treatment to quantify concentrations of pivotal cytokines associated with inflammation.

The anticipated findings hold significant implications for the potential of Gua Sha therapy as a novel approach to managing inflammation by modulating cytokine activity. By focusing solely on Gua Sha within the context of cytokine regulation, this research endeavors to contribute to a deeper understanding of the therapeutic mechanisms underlying this traditional practice in contemporary healthcare paradigms.



Abstract 42

Case Report: Eliminating Dairy as a Novel Treatment in Acne Vulgaris

Authors: Olnita Martini MS*¹, Elizabeth Tchernogorova BA², Ryan Cox BS², Parker Miller BS², Mary Tidwell BS², Nicole Skalka BS², Benjamin Brooks PhD ² *Olnita.Martini@co.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA
- (2) Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA

Acne Vulgaris is a common cutaneous disorder prevalent in 35 - 90% of young adults. This inflammatory condition involves hormonally responsive sebaceous glands characterized as chronic or recurrent papules and pustules. Acne Vulgaris has the potential to cause hyperpigmentation and scarring, showcasing its ability to not only be medically important but also exacerbate psychosocial affects for a patient. Acne Vulgaris has an array of complex factors that influence its condition, including genetics, hormones, and hygiene practices. However, the heritability of acne fails to explain its prevalence of over 80% in western countries. This brings into question the fact that despite the wide spread of knowledge in different causes of acne, diet intake, particularly dairy is often overlooked; highlighting the significant importance of diet as a critical link to acne.

Current treatment modalities for Acne Vulgaris focus on the usage of topical and systemic treatment formulations. Dermatologists typically begin their treatment plan by prescribing topical therapies such as retinoids and benzoyl peroxides, before taking the next step towards oral tetracyclines and spironolactone. For patients that experience severe acne that is unresponsive to the following medications, oral isotretinoin is prescribed. Although medications have been proven efficacious, the current body of research falls short in acknowledging diet modifications as an effective treatment plan.

In this case study, a 26-year-old Caucasian female was described with a 15-year history of cystic acne vulgaris and coinciding gastrointestinal symptoms, including abdominal pain and diarrhea, exacerbated by certain foods such as dairy, fried foods, and oils. Her symptoms mirrored those of her father. Additionally, she experienced a pruritic rash on her face, scalp, and shoulders, followed by erythematous cystic acne outbreaks mainly on her jawline, forehead, and scalp. Despite various treatments including chemical peels, facials, tetracycline, and topical tretinoin, her symptoms persisted until she was prescribed a six-month course of oral Isotretinoin, which greatly improved her skin condition but did not fully resolve her rash outbreaks and nodular acne triggered by dairy consumption.



Abstract 44

Cimex Lectularius Outbreak: Dermatologist Role in Mitigating the Expanding Infestations

Mia Panlilio¹, Elizabeth Tchernogrova², Sabrina Woessner¹, Olnita Martini¹, Leslie Torgerson MD¹

The escalating prevalence of Cimex lectularius outbreaks in Europe presents a significant challenge due to their resilient nature and ability to spread rapidly. These blood-feeding insects, commonly known as bed bugs, have garnered public concern as they thrive in various environments, including mattresses, wall cracks, and luggage, facilitating their dissemination across borders. The increasing incidence of bed bug infestations, particularly in densely populated urban areas, underscores the urgent need for effective control measures. This highlights the pivotal role of dermatologists in addressing this global issue by advocating for comprehensive patient assessments, including thorough travel histories, to facilitate early detection and management of Cimex lectularius infestations. Through heightened awareness and proactive engagement of dermatologists, coupled with effective preventive strategies, the adverse impact of bed bug infestations on public health can be mitigated, thereby ensuring the well-being of individuals worldwide.

Furthermore, the emergence of major outbreaks, such as the recent Paris bed bug infestation, underscores the interconnectedness of global travel and the potential for rapid disease spread. Dermatologists are uniquely positioned to educate patients about the risks associated with travel and provide guidance on preventive measures to minimize the transmission of bed bugs. By emphasizing the importance of early detection and intervention, dermatologists can play a crucial role in reducing the burden of bed bug infestations and associated health hazards. Collaboration between healthcare professionals, policymakers, and the public is essential to address this growing public health concern effectively..



¹Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA

²Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA

Abstract 45

Exploring the Relationship between Ichthyosis and Scalp Paresthesia: Potential Connection and Treatment Approach with Fluocinolone

Elizabeth Tchernogorova*¹, Parker Miller¹, Olnita Martini MS², Ryan Cox ¹, Nicole Skalka¹, Mary Tidwell¹, Benjamin Brooks PhD¹

- *elizabeth.tchernogorova@ut.rvu.edu
- (1) Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA
- (2) Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA

Ichthyosis is a genetic skin disorder marked by hyperkeratosis, pruritus, and scaling. This case study explores a potential association between ichthyosis and scalp paresthesia, a symptom not commonly linked with this dermatological condition. This case prompts a broader discussion on the need for increased awareness and education among healthcare providers regarding the diverse manifestations of ichthyosis. Enhanced understanding and recognition of these associations can lead to improved patient counseling, tailored management strategies, and, ultimately, better quality of life for individuals affected by ichthyosis.

Scalp paresthesia is the feeling of paresthesia or numbness along the occiput. While no cure for ichthyosis has been identified, the current treatment focuses on symptom reduction by decreasing size, erythema, thickness, and pruritis through prolonged bathing, skin hydration, retinoids, and fluocinolone. The findings highlight an understanding of potential new associated symptoms of ichthyosis and potential treatments for managing these unique symptoms.

A 26-year-old Caucasian male had suffered from ichthyosis since childhood, initially affecting his abdomen and extremities, managed with daily lotion. At 12, he had developed scalp paresthesia, occurring mainly in the evenings and possibly linked to fatigue or stress, prompting further investigation with no new neurological or dermatological disorders found. While his ichthyosis symptoms had gradually diminished after 18, he still experienced occasional skin irritation exacerbated by cold, dry climates but managed with lotion. Despite no ichthyosis on his scalp, he had experienced scalp paresthesia, especially under dry conditions, radiating to adjacent areas. These episodes had occurred sporadically and could be triggered by swimming or exposure to high air conditioning, lasting several hours until sleep.



Abstract 46

Longitudinal Study of Spontaneous Remission of Vitiligo: A Case Report

Ryan $Cox\ BS^{*l}$, $Mary\ Tidwell\ BS^{l}$, $Elizabeth\ Tchernogorova\ BA^{l}$, $Olnita\ Martini\ MS^{2}$, $Nicole\ Skalka\ BS^{l}$, $Parker\ Miller\ BS^{l}$, $Benjamin\ Brooks\ PhD^{l}$ *ryan.cox@ut.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine, Ivins, UT, USA
- (2) Rocky Vista University College of Osteopathic Medicine, Parker, CO, USA

This case report documents the unique journey of a pediatric patient who presented with rapidly progressing nonsegmental vitiligo, a condition characterized by hypopigmented patches on various parts of the body. The study aims to explore the phenomenon of spontaneous remission of vitiligo, shedding light on potential factors influencing disease progression and regression.

Vitiligo is a chronic skin disorder with significant psychological and social impacts, particularly in young patients. Understanding the factors contributing to spontaneous remission can inform treatment strategies and improve patient outcomes. This case study highlights the complex interplay of biological, psychological, and environmental factors. By documenting the patient's journey, the study contributes to our understanding of vitiligo pathogenesis and offers hope for individuals affected by this condition. The findings underscore the need for personalized treatment approaches and emphasize the potential role of hormonal changes in disease modulation.

In this case study, a 10-year-old Caucasian female initially noticed a large hypopigmented patch on her right hip, which rapidly progressed to affect various areas of her body within months. Stress was identified as a potential trigger for this progression. At 11 years old, she was diagnosed with nonsegmental vitiligo and began a rigorous treatment regimen including UVB light therapy, topical protopic and clobetasol ointments, folic acid, and B12 supplements, which led to partial pigmentation restoration within two years. However, she discontinued treatment at 13 due to perceived minor results. At 15, spontaneous pigmentation patches began to appear, gradually leading to significant remission by 18, with only patches remaining on knees, ankles, back, elbows, and wrists. By 20, vitiligo on knees, elbows, abdomen, and back had disappeared, leaving only small patches on wrists and ankles. Notably, this remission coincided with the onset of menarche at 14, suggesting a potential hormonal influence.



Abstract 47

Exploring a New Immunotherapy Treatment for Recalcitrant Verrucae

Kendrick Rubino¹, Elizabeth Tchernogorova¹, Corinne Ricci¹, Morgan Zueger¹, Jessica Kirk¹, Benjamin Brooks PhD¹ Kendrick.Rubino@rvu.edu ¹Rocky Vista University College of Osteopathic Medicine

This abstract presents a comprehensive exploration of verrucae, commonly known as warts, elucidating their prevalence, etiology, diagnostic methods, and treatment challenges. While conventional approaches like salicylic acid or cryotherapy offer limited success rates and often cause discomfort, the paper highlights the emerging promise of immunotherapy, particularly through various injections like MMR, tuberculosis PPD, and candida antigen. These immunotherapies have shown a remarkable 60% cure rate, especially in cases of multiple or refractory warts, providing patients with a less painful and more effective treatment option. Mechanistic insights into immunotherapy's efficacy against the Human Papillomavirus (HPV) are discussed, emphasizing its potential to target and neutralize the virus, thereby facilitating the skin's natural healing process.

Furthermore, the abstract advocates for FDA approval and enhanced accessibility of immunotherapeutic options like the MMR vaccine as a first-line treatment for warts. It addresses the current limitations in vaccine access faced by dermatologists and underscores the need for increased production and availability to alleviate patient burden. By synthesizing clinical evidence with advocacy for improved healthcare policies, this abstract contributes to advancing the therapeutic landscape for verrucae, offering a holistic approach to managing this challenging dermatological condition.



Abstract #48

Heterotopic ossification following bilateral ischial tuberosity avulsion fractures

Kaiser Nieman, M.A.*¹; Cody Majeskie, M.S.¹; Erin L. Robbins, M.S.¹; Lynne Stephenson, MSEd²; and Judd Allen, MD³

- * Kaiser Nieman: Kaiser.nieman@ut.rvu.edu
- (1) Rocky Vista University College of Osteopathic Medicine 1 (Doctor of Osteopathic Medicine, ((Ivins, UT))
- (2) Rocky Vista University College of Osteopathic Medicine 2 (Department of Library Services, ((Ivins, UT))
- (3) Utah Valley Orthopedics 3 (Orthopedic Surgery, ((Saratoga Springs, UT))

Pelvic apophyseal fractures, including ischial tuberosity avulsion fractures, are a rare, but life-changing injury for young athletes. The actual incidence of pelvic avulsion fractures remains elusive, and estimates can only be made from retrospective studies. One of the largest studies, found that over a 15-year period only 25.9% of 3193 patients who presented with a suspected hip avulsion fracture had sustained an avulsion fracture and less than 2% of those patients (160) had sustained ischial tuberosity avulsion fractures.

This is a case of a female in her 40s who sustained bilateral ischial tuberosity avulsion fractures in childhood, which were treated conservatively. The patient was able to return to full activity after about 9 months, but later evaluation found heterotopic ossification within the bilateral hamstring origins. She has dealt with pain and neurological symptoms since the injury resulting from the ossicles. The progressive ossification has been followed for the past 30 years through serial radiographs and is demonstrated in the study.

Given the rarity of this condition, consensus on the management of ischial tuberosity avulsion fractures remains elusive within the orthopedic surgery community. This report details the diagnosis and management of a representative case, including clinical presentation, current and potential management approaches, and long-term complications. Enhanced understanding of the long-term consequences of ischial tuberosity avulsion fractures will help to refine treatment strategies, mitigate complications, lower healthcare expenditures, and facilitate expedited recovery.



Abstract 49

Enhancing Safety and Communication in Anesthesia Care Team Models: A Survey-Based Study

Gregory Madsen BSN^{1*}, Hugh Zhang M.S.¹, Sanad Naber M.S.¹, Amanda Brooks, PHD¹, Craig Atkins DNP, CRNA¹

*Corresponding Author: Gregory.Madsen@ut.rvu.edu
(1) Affiliation 1 (Department of Research and Scholarly Activity, Rocky Vista University College of Osteopathic Medicine, (Ivins, UT))

Effective communication and teamwork between Anesthesiologists, Certified Registered Nurse Anesthetists (CRNAs), and Certified Anesthesiologist Assistant (CAAs) are paramount to ensuring patient safety and optimizing clinical outcomes in anesthesia care. This research project aims to address the following objectives: (1) Assess the current state of safety protocols and communication practices within anesthesia teams. (2) Identify perceived barriers to effective communication and teamwork between Anesthesiologists, CRNAs and CAAs. (3) Explore strategies proposed by participants to enhance interprofessional collaboration and mitigate risks in anesthesia practice. (4) Inform the development of targeted interventions and training programs to foster a culture of patient-centered care and teamwork efficacy within anesthesia care teams.

A 10-item survey (IRB# 2023-15) was created utilizing Qualtrics to be distributed to Anesthesiologists, CRNAs, and CAAs working within anesthesia care team models. After a review of relevant literature, survey items were validated by a third-party Physician Anesthesiologist and focus on critical areas of team function such as safety protocols, communication methods, perceived obstacles, and recommendations for improving teamwork. Qualitative responses will be prompted to provide insights into team member experiences, perspectives, and suggestions for enhancing collaboration and mitigating risks in anesthesia practice.

Survey responses will be analyzed using a mixed methods approach. Quantitative data will be analyzed using descriptive statistics and inferential analyses to assess the prevalence of specific practices. Concurrently, qualitative responses will be subjected to thematic analysis to identify common themes related to teamwork challenges and solutions, safety practices, and



communication dynamics. Statistical methods will be employed to quantify the prevalence of specific safety measures and communication strategies within anesthesia teams.

The findings from this research survey may hold significant implications for advancing patient safety initiatives and enhancing productive communication within anesthesia teams. By gaining a deeper understanding of the factors influencing safety and communication in anesthesia practice, this study aims to inform the development of targeted interventions and training programs tailored to enhance teamwork effectiveness and promote a culture of patient-centered care within anesthesia care teams. Ultimately, the research outcomes aim to contribute to the continuous improvement of anesthesia practice standards, fostering a safer and more collaborative environment for healthcare delivery.



Abstract #50

Navigating Unexpected Pathology in Cadaver Dissection as a First-year Medical Student: A Multinodular Thyroid Analysis

Kodi Jo McKinlay OMS II^{*1}, Dresdan Quackenbush OMS II¹, Kayla Johnson OMS II¹, Christian Klena OMS II¹, Amberly Reynolds, PhD¹

*Corresponding Author: kodi.mckinlay@ut.rvu.edu

(1) Affiliation 1: Department of Research and Scholarly Activity, Rocky Vista University - Southern Utah Campus, Ivins, UT

An enlarged multinodular thyroid gland was discovered in a cadaver dissection lab by a group of first-year medical students and subsequently showed why cadaver pathologies can serve as advantageous learning tools. The first indication of a pathologic thyroid occurred while dissecting the superior mediastinum where a large mass was appreciated overlying the great vessels. The donor in this dissection was a 95-year-old female whose frame supported an inferiorly displaced thyroid gland approximately 11 to 16 cm in both height and width and 5 cm in depth. The pyramidal lobe was unidentifiable and likely overtaken by the growth. The isthmus was impacted with its natural shape distorted and pulled into the two lobes. The thyroid appeared to be well-perfused with vasculature and contained multiple cyst-like sacs present on the surface. Dissection also revealed an absent bladder. A stoma on the anterior abdominal wall was consistent with an ileal conduit as part of a radical cystectomy. Her cause of death was urothelial bladder cancer and atrial fibrillation, prompting an exploration into hypothetical causes of why the bladder was removed but not the enlarged thyroid.

An extensive literature review has yet to reveal a cadaveric specimen with a thyroid gland this enlarged. Nodules can start causing obstructive symptoms at just 4 cm in size. It is unusual for a gland of this size to not be removed. The patient must not have suffered severe obstructive symptoms, or the providers deemed no reason to remove the gland at her advanced age and prognosis of the primary illness. The most common metastases to the thyroid are renal cell carcinoma (RCC) (48.1%), colorectal carcinoma (10.4%), and lung cancer (8.3%)¹. However, this cadaver's medical history identifies a rare possibility in which urothelial cancer of the bladder metastasized to the thyroid gland², of which only 3 have ever been identified in literature³⁰. A histological sample of the thyroid would confirm this diagnosis and a tumor of this size would usually prompt an immediate thyroidectomy with additional chemotherapeutic regimens to eradicate any further metastases. The indication for such a review may actually be to showcase the benefit its preparation served for future physicians eager to develop etiologic theories on pathological cadaveric specimens.



Abstract #51

Gastric Ultrasound: A Quick Perioperative Solution for Semaglutide Patients

Madison Garlock*¹, Miranda Speth², Mark Wardle, DO¹, *Corresponding Author: Madison.garlock@ut.rvu.edu (1) Rocky Vista University COM (Ivins, UT))

As GLP-1 agonists, such as semaglutide, continue to gain popularity among both the diabetic and nondiabetic population alike, it is critical that we understand their consequences as related to increased residual gastric content secondary to delayed gastric emptying and subsequent increased risk of intraoperative aspiration.

Fasting recommendations provided by the American Society of Anesthesiology (ASA) were put in place to mitigate this risk. However, research conducted specifically on preoperative gastric content in patients with Type 2 Diabetes using point-of-care ultrasound showed that almost half of these patients had a full stomach after appropriately following preoperative fasting guidelines (Zhou et al., 2019). Because of this, preoperative gastric ultrasounds are recommended for all diabetic patients undergoing any surgery.

The theory in question here is gastric emptying rates and preoperative gastric content volumes in the nondiabetic patients taking diabetic medications for weight loss. The decision to hold GLP-1 agonists, like semaglutide, prior to surgery and for how long remains entirely a judgment call to this point (McNamara, 2013). Due to their staggering surge of popularity, which shows no promise of slowing down, the literature suggests that GLP-1 agonist-specific guidelines need to be created following further research into their effects on delayed gastric emptying and residual gastric content for diabetic and nondiabetic patients alike. Further research is needed to determine if a true difference in rate of gastric emptying exists between diabetics and nondiabetics on semaglutide.

Anesthesiologists are already familiar with US and its non-invasive, cost-effective, and easily available qualities—an implementation of routine ultrasounds for patients who report or are suspected of having a history of semaglutide use may be a quick and cost-effective solution to assess risk of intraoperative pulmonary aspiration.



Abstract #52

Postpartum Depression in Lower Income Countries: Social Support Critical

Madison Garlock*¹, Miranda Speth², Shaun Schofield¹, Marcos Muller¹, Logan Wesemann¹, Mark Wardle DO¹, Matthew McEchron²

*Corresponding Author: Madison.garlock@ut.rvu.edu

- (1) Rocky Vista University COM (Ivins, UT))
- (2) Rocky Vista University COM (Parker, CO))

INTRODUCTION: Postpartum depression (PPD) is a serious public health concern that affects 1 in 5 women who give birth within the United States; however research is lacking regarding women in developing countries. The purpose of this research is to further elucidate the concerns of mothers in developing countries in comparison to women in the United States (US).

METHODS: Surveys were dispersed in local medical clinics in the Dominican Republic (DR) and Panama to collect information from women who had given birth at least once. A survey was also provided to women in the US, via social media, who had given birth at least once.

RESULTS: Survey results suggest significant differences in the ratio of feelings of sadness between mothers in the US when compared to mothers in DR and Panama. Younger Latina mothers reported "Sadness" less often than their US counterparts but when they did, they also reported less support. These findings suggest that there is a higher incidence of depression in mothers within the United States and a negative correlation between sadness and support for mothers in developing countries.

CONCLUSION: Postpartum depression represents a pressing public health concern necessitating further in-depth research and understanding. Our study helps further elucidate the differences in PPD prevalence among varying countries of origin. Physicians and other providers should take into account that every patient has the potential to be affected by PPD, regardless of demographic, socioeconomic status, or family support and that proper care and procedures should be taken for all.



Abstract #53

The Effects of Extended Reality on Intraocular Pressure: A Literature Review

McKay Berges*¹, Jacob Wagner²

*Corresponding Author: McKay.berges@ut.rvu.edu

- (1) Affiliation 1: Rocky Vista University COM, Ivins, UT
- (2) Affiliation 2: Rocky Vista University COM, Ivins, UT

Glaucoma is a major cause of global incidences of blindness, ranking second only to cataracts as a cause of blindness worldwide, and remains the leading contributor to irreversible blindness. Elevated intraocular pressure (IOP) plays a central role in glaucoma pathogenesis. Evidence suggests that both smartphones and computer screens transiently elevate IOP. As the adoption of extended reality (XR) devices—such as virtual reality (VR), and mixed reality (MR)—grows, understanding their impact on IOP becomes paramount for effective glaucoma management and prevention. Investigating whether prolonged screen and XR use contributes to elevated IOP clarifies their potential as risk factors for glaucoma development or exacerbation of symptoms and vision loss.

A comprehensive literature search was performed about the use of various types of screens and IOP using Pubmed, Cochrane, Scopus and Google Scholar. We retrieved literature using the following terms to generate searches in the previous databases: Intraocular pressure, IOP, Ocular Hypertension, Ocular Hypotension, Ocular Perfusion Pressure, Smartphone, Cellphone, Computer, Computer Vision Syndrome, Computer Screen, Virtual Reality, Extended Reality. Relevant research to the use of screens effecting IOP were selected for. No studies earlier than 2019 were found or used.

Both healthy individuals and those with glaucoma exhibit increased IOP during computer and smartphone use, whether for reading, writing, or watching movies. IOP's taken before and after 25 minutes of cell phone use show an increase from 13.7 ± 1.8 mmHg to 17.0 ± 1.7 mmHg respectively, a significant increase. Intriguingly, VR appears to have a different impact. Studies suggests that watching movies in VR has minimal effect on IOP and may even reduce it, with an average IOP of 16.18 ± 2.13 and 16.24 ± 2.29 mmHg, respectively, before using VR glasses and a statistically significant 14.14 ± 2.16 and 14.18 ± 2.17 mmHg, respectively, after using VR glasses.

The evidence consistently points to elevated IOP during traditional screen use, including computers and smartphones. Yet, the impact of XR devices introduces intriguing nuances of no increase or even decreases in IOP. These findings emphasize the need for further research to unravel the mechanisms governing IOP fluctuations during screen-based activities. Such insights will guide strategies to mitigate potential risks associated with prolonged screen and XR device usage, particularly for individuals at risk for or living with glaucoma.



Abstract #54

Embracing Intimacy: Enhancing Sexual Health in Aging Populations

Melanie Herbert OMS-I*¹, Mikaela Cavalieri MS OMS- I¹, Zainab Khan OMS-1¹, Michelle Wood MBS OMS- I¹, Lynne Graves Stephenson MSEd², Amberly Reynolds MS PhD³ *Corresponding Author: melanie.herbert@ut.rvu.edu

- (1) Rocky Vista University COM, Ivins, Utah
- (2) Department of Library Services, Rocky Vista University, Ivins, Utah
- (3) Department of Anatomical Sciences, Rocky Vista University, Ivins, Utah

Sexual activity continues into aging, yet there is a lack of comprehensive knowledge on how providers address the sexual health needs of the elderly. This knowledge gap points to the need for better clinical documentation and sexual health treatment of older adults. We aim to create a comprehensive literature review regarding attitudes of providers on topics about sexual health care of older adults, normalizing sexuality of older adults, and the benefits of sexual education in older adults. Search terms such as "sexual health", "sexual health education", "older adults" and "workshop" were utilized to search PubMed, Scopus, and Cocharne. Articles included in this review were within 10 years and associated with sexual health or sexual education of the elderly. Based on this review, our findings will provide guidance on how providers can broach sexual health conversations with older adults. The review also can identify gaps in clinician education on elderly sexual health. Our goal is to make this review a consolidated point of reference for clinicians to use to enhance the care of older patients.



Abstract #55

Unveiling Distinctive Symptoms and Screening Strategies for Early Detection and Treatment of Solid Pseudopapillary Neoplasm of the Pancreas

Michael Richardson OMS-I*¹, Nicholas Gerber OMS-I¹, Catherine Wheeless MS OMS-I¹, Whinkie Leung MS OMS-I¹, Lynne Graves Stephenson MSEd²

*Corresponding Author: Michael.richardson@ut.rvu.edu

(1) Affiliation 1: Rocky Vista University COM, Ivins, UT

(2) Affiliation 2: Library Services, Rocky Vista University COM, Ivins, UT

Solid pseudopapillary neoplasms of the pancreas (SPN), formerly known as Hamoudi Tumors, are classified as rare, low-grade malignant tumors with a high five-year survival rate of approximately 97%. SPNs are often present in young adult females or adolescents, and if symptomatic, patients may present with symptoms such as right upper quadrant pain, nausea, and loss of appetite which are consistent with numerous common diseases or disorders. While outcomes are generally favorable, early diagnosis is critical to minimize metastasis harm or additional tissue damage. This literature review will distinguish the symptoms specific to an SPN and determine how these symptoms, along with screening techniques, can aid in early diagnosis and treatment.

The methodology for this literature review involved a systematic search of peer-reviewed literature from 2013 to 2024 that addressed symptoms, outcomes, and treatment of SPN in adults and adolescents. Non-English articles were excluded, with a focus on works accessible in the English language. Utilizing databases such as PubMed, Scopus, Cochrane, and Google Scholar, a strategic search was performed using relevant MeSH terms and keywords. Boolean operators were employed to combine terms like "solid pseudopapillary neoplasm," "pancreatic cancer," "neoplasm invasiveness," "pancreatectomy," "treatment outcome," and "signs and symptoms" to ensure a comprehensive retrieval of pertinent studies.

Statistics suggest that solid pseudopapillary neoplasms of the pancreas are remarkably rare forms of pancreatic cancer that overwhelmingly present in young females. While the prognosis is favorable, early diagnosis and surgical resection are crucial to prevent complications and more invasive procedures. This timely detection can be achieved through thorough screening and recognition of the distinguishing features of this tumor.



Abstract # 56

Gut Feeling: Investigating The Gut Microbiome as Treatment for Rheumatoid Arthritis

Mikaela Cavalieri MS OMS-I¹, Norma Albarran OMS-I², Lynne Graves Stephenson MSEd²

- (1) Rocky Vista University Utah, College of Osteopathic Medicine, Ivins,
- (2) Department of Library Services, Rocky Vista University, Ivins, Utah

Rheumatoid Arthritis (RA) is an autoimmune disease that affects the joints, leading to pain, swelling, and tenderness. In recent years, the gut microbiome has been investigated in relation to Rheumatoid Arthritis. Evidence suggests that diets high in processed fats and sugars can lead to increased systemic inflammation, thus worsening symptoms of RA. There is much research on foods that cause inflammation, but little has been done on synthesizing foods that are anti-inflammatory.

This literature review aims to analyze the multitude of ways supplements or diet modifications can be beneficial to a person with RA. Search terms such as "arthritis, rheumatoid", "gut microbiome," and "therapeutics" were utilized to search PubMed, Cochrane, Scopus, and EBSCO. Articles included in this review were within 10 years and had implemented some form of gut microbiome alteration. We found that dietary modification such as probiotics/probiotic food, Vitamin K, dietary fiber, spices and Mediterranean diet have shown promise in decreasing inflammation in RA patients. This review aims to widely disseminate this information so Rheumatoid Arthritis patients can empower themselves to influence their symptoms.



Abstract #57

Early Outcomes after Third Generation Trabecular Micro-Bypass Performed with Phacoemulsification in Patients with Open-Angle Glaucoma

Nadia Alinaghizadeh MS OMS-II*1, Connor Prendergast OMS-I2, Zachary Vest MD3

 $*Corresponding\ Author:\ Nadia.alinaghizadeh@ut.rvu.edu$

- (1) Rocky Vista University COM, Ivins, Utah
- (2) Rocky Vista University COM, Parker, CO
- (3) Mile High Eye Institute, Sheridan, CO

Around 3 million Americans have glaucoma which is a leading cause of blindness in patients over sixty years old. Individuals who have glaucoma are tasked with the critical responsibility of regulating their intraocular pressure for a lifetime. Despite their best efforts to remain compliant with medications, most patients will need a procedure to control their rising intraocular pressure. Micro-bypass technology such as stent placement in a non-invasive procedure has proved to be beneficial in controlling glaucoma. The iStent infinite was launched in 2022 and has three total stents which makes it unique from previous models. It is proposed that this feature increases efficacy by facilitating more outflow of aqueous fluid.

The purpose of our project is to analyze data from iStent infinite procedures and to learn about the benefits and safety profile of this new device. Our project is a retrospective chart review analyzing the information from Dr. Vest's iStent infinite procedures which are performed during the same time as cataract (phacoemulsification) surgery. The changes in intraocular pressure, medication load, and adverse events are followed closely. We will also implement statistical analysis to better observe patterns within the data.

We currently have data for 28 patients and 41 eyes total (bilateral and unilateral procedure data). Based on our preliminary 6-month data for these patients, we observed decreased intraocular pressure (IOP) in 80% of the eyes. Four total adverse events were reported, and these incidents resolved quickly. The limitation of our study includes having a small dataset with a limited number of patients. Also, it is important to compare our data with the information from previous stent models utilized by Dr. Vest to learn about the unique features of this new technology.

The iStent infinite was recently launched in 2022. There is a lot of literature discussing the safety and efficacy of previous stent models, but there is a need for more research on this new device. Our project is providing important information about iStent infinite and will serve to assist ophthalmologists in choosing the best treatment for their glaucoma patients.



Abstract #58

Title (Bold, Font – Times New Roman, font size 14, sentence case)

Rebecca Franklin MS, OMS II*¹, Alexandra Calescibetta OMS II¹, Parker Miler OMS II¹, Lynne Stephenson MEd², Amanda Brooks PhD³

*Corresponding Author: Rebecca.franklin@ut.rvu.edu

- (1) College of Osteopathic Medicine, Rocky Vista University, Ivins, UT
- (2) Frank Ritchel Ames Memorial Library, Rocky Vista University, Ivins, UT
- (3) Office of Research and Scholarly Activity, Rocky Vista University, Ivins, UT

An aging population and oncoming concerns of a "silver tide" provide a sense of urgency in mitigating fall incidents, with an estimated fall-related injury occurring every 19 minutes in the United States. Unexpected falls in geriatric patients are a leading cause of emergency room visits and accidental deaths in patients over 65 and 75, respectively. Fall injuries additionally pose a significant financial burden on the United States healthcare system, with an estimated average individual cost of emergency room treatment around \$36,000, and an annual fall attributed cost of \$50.0 billion in 2015 alone.

The Feldenkrais Method emerges as a promising solution to not only reduce fall incidents, but also enhance the neuroplasticity of the aging brain by using a holistic approach to improve balance, mobility, and well-being through sensory awareness and mindful movement practices.

This review aims to assess the Feldenkrais Method as a potential solution for preventing falls among elderly individuals. By utilizing electronic databases such as PubMed, Google Scholar, Cochrane, and EBSCO we are hoping to find a correlation between the Feldenkrais method and fall reduction. Search terms will include "fall prevention AND the Feldenkrais method," "fall prevention in elderly/geriatric patients," and "the feldenkrais method and balance." Inclusion criteria will likely include studies in English from the past five years that address patients over 65 and the use of the Feldenkrais method.

We aim to find evidence supporting the Feldenkrais Method as a promising approach for fall prevention, improvement of patient outcomes, and enhancement of overall quality of life. Limitations to this study might include small sample size due to restriction to the English language and lack of access or knowledge about the Feldenkrais method.

Our research hopes to further validate and promote the benefits of the Feldenkrais Method in enhancing body awareness, movement efficiency, and neuroplasticity, particularly in the context of fall prevention within geriatric care.



Abstract #59

Title (Addressing Maternal Mortality in South Asia: Strategies for Hemorrhage Prevention and Sanitation Improvement)

Sabitra Niroula OMS I*. Author email: Sabitra.niroula@ut.rvu.edu (1) Affiliation 1 (Rocky Vista University COM, Ivins, UT)

Maternal mortality, defined as death resulting from pregnancy-related causes or occurring during childbirth or up to 45 days postpartum (UNICEF, 2015), disproportionately affects South Asian women, with a reported risk of 1 in 240 births (UNICEF, 2023). Hemorrhage stands as a significant contributor to maternal mortality in South Asia, claiming 127,000 lives globally annually (Chelmow, 2008). The incidence rate in South Asia exceeds the world average, with 30% of maternal deaths attributed to hemorrhage. Postpartum hemorrhage often arises from inadequate uterine contraction after placental delivery, exacerbated by the unavailability of oxytocin injections and skilled birth attendants (Chelmow, 2008). Oxytocin administration is crucial to prevent excessive bleeding by promoting uterine contractions (McEvory and Sabir, 2021; Kartoglu et al., 2017).

Sepsis also poses a significant threat to maternal health in South Asia due to unsanitary conditions leading to sepsis-induced immunosuppression (Hibbert et al., 2018). Open defecation, particularly rampant in South Asia, contaminates drinking water and fosters diarrheal diseases, contributing to dehydration and severe consequences, including death (Aziz et al., 2021).

Research underscores that improving skilled birth attendance, bolstering medical provider density, and facilitating access to oxytocin can mitigate maternal mortality by reducing hemorrhage and enhancing education (Fikree et al., 1998). Accordingly, government funding should prioritize retaining skilled healthcare providers, enhancing oxytocin storage accessibility, and improving access to clean water and soap to address these critical challenges.



Abstract #60

Exploring the Impact of Social Determinants of Health on Follow-Up Medical Care for Sexual Assault Survivors Post-Initial Emergent Evaluation: A Literature Review

Sadie Rowland OMS I*1, Taylor Glanz OMS I1, Lynne Graves Stephenson2

*Corresponding Author: sadie.rowland@ut.rvu.edu

- (1) Affiliation 1: Rocky Vista University College of Osteopathic Medicine, Ivins, UT
- (2) Affiliation 2: Library Services, Rocky Vista University, Ivins, UT

Each year, approximately 400,000 women in the United States experience sexual assault. Of these 400,000, less than 21% receive emergent care, and of those, only 40% follow up with a primary care provider due to the obstacles facing sexual assault survivors who might seek treatment.

The authors of this literature review combed the published literature to locate sources that discuss social or economic barriers to sexual assault survivors seeking follow-up care. Articles about legal obstacles were excluded. Using PubMed, Scopus, Cochrane, and Google Scholar databases, searches for articles containing relevant MeSH terms, keywords, and entry terms, such as "sex offenses," "survivors," "healthcare utilization," "delivery of healthcare," "resource-limited areas," and "social determinants of health" were conducted to identify age, education, income, rural/urban setting, and race as the primary social determinants. Demographics included women of older age, women with a high school education or less, women of African American and Hispanic descent, and women living in a rural setting.

Current research only scratches the surface, addressing specific barriers, and needs to provide the comprehensive data required to initiate more positive outcomes. Focusing on these key barriers will allow for responses tailored to patients seeking care while fostering awareness. By exploring the predominant factors affecting individuals who did not seek follow-up care, this literature review aims to furnish survivors, healthcare providers, and community organizations with the information needed to improve the standard of care.



Abstract 62

Examining the Relationship Between Nitrous Oxide Exposure in Dental Settings and Vitamin B12 Deficiency, With A Focus on Depression: A Literature Review

Sanad Naber MS OMS-II *1, Hugh Zhang MS OMS-II 1, Gregory Madsen OMS-II 1, Amanda Brooks, PHD 1

*Corresponding Author: Sanad.Naber@ut.rvu.edu
(1) Affiliation 1: Department of Research and Scholarly Activity, Rocky Vista University COM, Ivins. UT

Background: Nitrous oxide (N_2O) , commonly referred to as laughing gas, is extensively utilized in dental offices as an inhaled, sedative, analgesic gas to alleviate anxiety and pain during procedures. Studies conducted in recent years provide compelling evidence suggesting that there are potential adverse effects of prolonged exposure to N_2O , especially on decreased vitamin B12 levels. This literature review aims to explore the relationship between chronic occupational exposure to N_2O in dental offices and the occurrence of vitamin B12 deficiency and depression.

Methods: We conducted a thorough search across PubMed, Google Scholar, Medline, and OVID to explore the link between chronic N2O exposure in dental offices and depression due to vitamin B12 deficiency. We employed several search terms and medical subject headings that included: "Nitrous Oxide", "vitamin b12 deficiency", "occupational exposure", and "depression". We also included studies spanning the last decade, incorporating diverse methodologies such as cross-sectional surveys, cohort studies, and case-control analyses. Selected articles assessed outcomes through serum B12 levels, homocysteine concentration, and neurological evaluations, supplemented by relevant historical works and cases of N2O abuse to establish connections.

Results: This review examined 13 case reports and series involving 25 patients, alongside two systematic reviews and 28 original research articles. Analysis of case reports and literature reviews revealed neurologic complications associated with vitamin B12 deficiency, most notably weakness (n=4), paresthesia (n=3), ataxia (n=4), and subacute combined degeneration of the spinal cord (n=4). Among these studies, occupational exposure to N₂O was linked to alterations in vitamin B12 metabolism within the healthcare workforce. Further, data from the 28 research articles indicated that timely supplementation with vitamin B12 showed significant improvement in neurological symptoms.

Conclusion: Our literature review provides compelling evidence of the relationship between chronic N_2O exposure in dental offices and Vitamin B12 deficiency among dental professionals. Further analysis revealed higher N_2O concentration correlates with increased B12 depletion and heightened risk of depressive symptoms. Prioritizing occupational safety protocols in dental offices is crucial to mitigate B12 deficiency and safeguard personnel well-being.



Abstract 63

Empiric Treatment for Unspecified Pneumonia

Cowles, Tristan OMS II* 1, Jonathan Knudsen OMS II 1, Chris LaFontano, DO 2

*Corresponding Author: tristan.cowles@ut.rvu.edu

- (1) Rocky Vista University College of Osteopathic Medicine (Ivins, UT)
- (2) Rocky Vista University College of Osteopathic Medicine (Parker, CO)

An 82 -year- old male who resides in Utah presented to the emergency department with a chief complaint of shortness of breath, cough, fatigue, chest pain and a low oxygen saturation. The patient has a history of sleep apnea which requires the use of a CPAP (continuous positive airway pressure) machine, atrial flutter post ablation, hyperlipidemia, acid reflux, and pulmonary hypertension, but is otherwise healthy.

The patient was admitted to the hospital with a diagnosis of community-acquired bacterial pneumonia based on presenting symptoms and chest X-ray. Cultures were taken and empiric antibacterial therapy of Rocephin, Zosyn, and Azithromycin was administered. Three days after being admitted, he developed hemoptysis with no improvement of his presenting symptoms. On day five of admission, with no bacterial growth on cultures, the patient was placed on an antifungal treatment consisting of Fluconazole. This began an improvement of his symptoms, and he was discharged home after 14 days in the hospital.

Although it is uncommon for an immunocompetent person to get fungal pneumonia, the patient improved once antifungals were administered. It was postulated that he may have contracted the illness from an unsanitary CPAP. Those who have sleep apnea are at a higher risk for developing pneumonia (Su, 2014). This case serves as a reminder, when a patient presents with pneumonia, especially those using a CPAP machine, to keep fungal pneumonia on the differential diagnosis list. Based upon the outcome of this case report, the risks of developing fugal pneumonia when using a CPAP machine should be further investigated.



Abstract #64

Unusually Delayed Diagnosis of BIA-ALCL: A Case Report

Ysatis Ruiz OMS-II, Rocky Vista University, Jamie Moenster, D.O., D.F.A.C.O.S, F.A.C.S *Corresponding Author: Ysatis.ruiz@ut.rvu.edu

- (1) Rocky Vista University COM, UT
- (2) Jamie Moenster, D.O, D.F.A, C.O.S, F.A.C.S, AZ

Anaplastic large cell lymphoma (ALCL) is a rare form of non-Hodgkin lymphoma (NHL) and subtype of T-cell lymphoma accounting for 1% of all NHL and 16% of T-cell lymphomas. A subtype of ALCL is Breast Implant Associated -ALCL (BIA-ALCL) which develops following textured, synthetic implant placement and occurs in up to 1 in 2,969 women with breast implants. Early diagnosis can lead to better treatment response and may reduce the need for more extensive interventions, potentially impacting healthcare costs. This case study serves as an example of how CD markers and biopsy may be negative with a positive BIA- ALCL diagnosis. This unique cause is to increase awareness to delayed diagnosis to BIA-ALCL.

A case report on a 55-year-old female with late-onset seroma years after cosmetic textured, saline breast implants that resulted in rapidly progressing BIA-ALCL. She underwent multiple cytologies and capsule biopsies that resulted negative for CD30 staining and histologically negative for cancer. Classic presentation of BIA-ALCL is within 8 to 10 years of implantation with constitutional symptoms of swelling and pain on the affected side. This case was unique because the cytology and capsule biopsy were initially negative for CD30, but later PET scans and biopsy were positive for CD30, CD3, CD4, CD5, and CD43 after development of a palpable mass. Bilateral Capsulectomy performed and CHOP chemotherapy with radiation was utilized for BIA-ALCL treatment.

This case demonstrates a rare instance that normal diagnostic measures failed to identify BIA-ALCL and confirms a high incidence of suspicion on clinical exam and alternative diagnostic methods may need developed to better diagnosis BIA-ALCL. Enhancing early detection of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) outside of cytology detection involves a multi-faceted approach that incorporates advancements in various areas. Changes and advancements that can be made in the future can be international consortia focused on BIA-ALCL research to accelerate progress in early detection and improve patient outcomes. Developing rapid, point-of-care diagnostic tests for BIA-ALCL can be performed in clinical settings may facilitate early detection and monitoring of the disease. Portable devices or assays capable of detecting specific BIA-ALCL biomarkers could enable timely intervention and management. patient outcomes.



Abstract #66

The Role of Pain Medications in Modulating Recovery Following Peripheral Nerve Injury

Brian S.H. Chong*¹, Jeffrey D. Goodwin*¹, JuliAnne E. Allgood², Logan Whitney³, Jessica Pullan, PhD³, Amanda Brooks, PhD¹

*Corresponding Author: <u>brian.chong@ut.rvu.edu</u>, <u>jeffrey.goodwin@ut.rvu.edu</u>

- (1) Affiliation 1: Rocky Vista University COM, Ivins, UT
- (2) Affiliation 2: Department of Neuroscience, University of Wyoming, Laramie, WY
- (3) Affiliation 3:Department of Chemistry & Physics, Southern Utah University, Cedar City, UT

Traumatic peripheral nerve injuries (PNI) significantly contribute to chronic pain and reduced quality of life, with incidence rates ranging from 3% in trauma cases to 8-25.4% in iatrogenic injuries. Managing PNI with analgesics is crucial due to the higher prevalence of chronic pain in PNI patients compared to others. Preclinical models and case studies suggest that the choice of pain medication influences nerve regeneration outcomes, influenced by factors such as drug mechanism, concentration, synergy with adjuvants, route, and timing of administration. Despite its clinical importance, a comprehensive resource comparing the efficacy of primary pain medications in neuropathic pain management and nerve regeneration is lacking. This review aims to explore the pharmacokinetics and pharmacodynamics of commonly prescribed PNI pain medications - opioids, NSAIDs, corticosteroids, local anesthetics, and GABA analogs, to understand their actions on peripheral nerve fibers. Systematic searches in online databases -PubMed, Elsevier, Google Scholar, and EBSCOhost, yielded relevant articles and case reports. Keywords such as "peripheral nerve injury," "traumatic nerve injury," and "nerve injury" were utilized to conduct the search, along with specific drug classes under investigation including "opioids," "opiates," "morphine," "corticosteroids," "dexamethasone," "methylprednisolone," "prednisone," "lidocaine," "NSAID," "NSAIDs," "gabapentin," and "pregabalin." Screening criteria excluded cases predating 2000, individuals under 18, non-traumatic or iatrogenic injuries, unspecified injury mechanisms or analgesics, and non-English publications. Clinical cases and studies were then analyzed to assess the correlation between the choice of analgesic and injury recovery/outcome. Preliminary findings suggest that expertly administered corticosteroids and subanesthetic lidocaine, alone or in combination, show promise in PNI recovery, potentially surpassing outcomes associated with opioids and NSAIDs. Additionally, managing neuropathic pain with GABA analogs appears more favorable compared to opioids or NSAIDs alone. However, further analysis is needed to understand the intricate relationship between neuropathic pain management and nerve regeneration. Study limitations encompass the absence of control over variables such as patients' sex, age, race, environment, use of adjuvant therapies such as physical therapy and alternative medicine, or the use of mixed analgesic classes and the synergistic properties of combined drugs. The timing, dosage, and route of administration was not standardized across all cases and studies.



ABSTRACT RUBRIC

Case Report	0	1	2	3
	Missing	Poor	Good	Excellent
Case Description		Limited background and details of examination	Adequate	Comprehensive and clear detail including history and examination
Uniqueness	Not unique	Unclear uniqueness	Moderately unique	Clear description of uniqueness and is instructive.
Importance in the field	Not discussed	No clear importance in the field	Limited impact in the field	Clear description of importance. Could have significant impact on the field
Diagnosis/Treatment	Not described	Unclear diagnostic strategy, no justification of treatment	Adequately described diagnostics and treatment regimen	Clearly described diagnostics and justified treatment
Discussion	Missing	Case is not discussed in the context of the literature	Case is summarized but not connected to the current literature	Case is summarized and placed in the context of the literature and the field with clear impacts identified
Overall				
Professional Writing	Grammatical errors, typos impede understanding, inappropriate verb tense; Non- compliant with template	Many grammatical errors and typos but it does not impede understanding; inappropriate verb tense; Writing is unfocused or not engaging; Too much jargon	Few grammatical errors and typos; mixed verb tense; Writing is somewhat engaging	Writing is appropriate for the profession; Acronyms are defined at first use; Appropriate verb tense; Writing is engaging



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