#35 Brian Witrick

Poverty and Population Health – The Need for A Paradigm Shift to Capture the Working Poor and Better Inform Public Health Planning

Abstract

Background: Poverty, and socioeconomic disparities are one of the most omnipresent public health issues across the globe that have been causally linked to increased risk of disease, disability, and death. However, few studies have incorporated the working poor, who potentially experience greater health and social vulnerability than households in poverty due to their restricted access to public assistance programming due to a wage slightly above the federal poverty threshold.

Objective: To 1) compare the geographic distribution of households in varying levels of low socioeconomic status (poverty, working poor, or either); and 2) determine how access to primary care is influenced by household socioeconomic status.

Methods: Using 2019 West Virginia data from the American Community Survey and the United Way, global and local spatial autocorrelation tests were conducted for each socioeconomic measure. For access to care, cluster maps for each measure were then overlaid with a 30-minute drive time layer for all rural health clinics in West Virginia.

Results: Communities with a high percent of working poor households are distinct and located in different areas of West Virginia than communities of a high percent of households in poverty. Different geographic patterns for each socioeconomic measure across West Virginia resulted in a 24.2% difference in access to care outside of a 30-minute drive time to a rural health clinic for communities with a high percentage of working poor households.

Conclusions: A more inclusive definition of low socioeconomic status, including households designated as working poor, is needed to effectively address health disparities.

#34 Kassandra Whitfield

New patient visits with the gynecologic oncology providers at the Mary Babb Randolph Cancer Center (MBRCC) from August of 2020 to August of 2022 were extracted from the administrative database. There was a total of 1,110 new patient visits. The zip code of each new patient was processed through the ArcGIS Geographic mapping software to create a location map. A drive time analysis was used to calculate the drive times toward the Mary Babb Randolph Cancer Center at WVU Medicine. Increments included the distance in minutes from patient's zip code to the Cancer Center. These increments were 0-30 minutes, 30-60 minutes, 60-120 minutes, 120-180 minutes, 180-240 minutes, and greater than 240 minutes. The drive time analysis and zip code data points were aggregated to calculate the number of patients who lived within each drive time area.

Nearly half of the new gynecologic oncology patients seen at the MBRCC drive greater than 60 minutes to reach the cancer center. This analysis of the data points shows one of the reasons for the poor accessibility to health care in rural populations like West Virginia. Given the drive time of this patient population, ensuring appropriate follow-up, surgical planning, hospital admissions, chemotherapy and radiation treatments, and surveillance can be hindered. Geographic constrictions are not exclusively based on physical distance, but can include access to personal or public transportation, sufficient funds for gas, and weather conditions. Further research is needed to evaluate ways to improve access in this population of patients.

#33 Jinju Wang

Altered level and miR cargoes of perivascular adipose tissue exosomes in type 2 diabetic mice

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Background: Exosomes (EXs), a major type of extracellular vesicles, are emerging as a novel type of intercellular communicators. MicroRNAs (miRs) are one of the major executors of EXs. The previous study shows that lean and obesity adipocyte tissue EXs could elicit different effects in response to insulin sensitivity, the underlying mechanism is related to their carried miRs. Given EX cargoes and function vary on their cellular status, we speculate the miR profiling of EXs derived from the perivascular adipose tissue (PVAT) is altered in diabetic conditions.

Methods: EXs were isolated from the PVAT tissue of type 2 diabetic db/db and control db/c mice. EX size and concentration were analyzed by nanoparticle tracking analysis. The miR profiling of PVAT-EXs was analyzed by mmu-miR miRome profiling kit. The miRs of interest were further validated by qRT-PCR.

Results: 1) The PVAT-EXs level was higher in diabetic db/db mice than in non-diabetic db/c mice; 2) In db/db mice, the exosomal miRs profile was changed. The exosomal miRs, miR-223, miR-181a, miR-146a, miR-34a, and miR-210, were either down-regulated or up-regulated > 3-fold when comparing that in db/c mice. Among these candidate miRs, miR-181a, miR-223, miR-210, and miR-146a might be involved in modulating adipose tissue inflammation and/or vascular function. MiR-34a could participate in white adipose tissue browning, macrophage polarization, and glucose tolerance.

Conclusion: Our data have demonstrated that the miR profiling of PVAT-derived EXs is changed in type 2 diabetic conditions, which suggests the functions of these EXs might be altered in diabetic conditions.

#32 Suzanne Vogler

Physical inactivity and poor sleep are associated with negative health outcomes such as cardiovascular disease, type-2 diabetes, and increased risk of stroke, cancer, or early death. These behavioral risk factors are particularly problematic for mid-life adults (ages 55 to 65). This feasibility study was intended to develop and test a 12-week health promotion and education intervention to address physical activity and sleep with mid-life adults in private Facebook groups. Reported here are the results of user engagement and qualitative interviews of participants who completed the early phases of this project. The study design was a single-arm feasibility trial that included measures of engagement, qualitative interviews, and qualitative analysis of participant-generated comments. Evidence-based physical activity and sleep content were adapted for digital delivery as infographics and posts guided by Facebook's recommended best practices. Forty-three participants completed baseline assessments and 38 were assigned to private Facebook groups (Mage = 55.29, Mweight = 198.40). The average daily engagement of study completers was 1.17 posts, 3.05 comments, and 3.99 reactions. A content analysis of interview results and comments in the private Facebook groups revealed several themes: 1) daily reminders, 2) supportive others, 3) educational content for building new habits, and 4) videos were viewed as helpful. The preliminary feasibility of this study was demonstrated but more data collection currently underway will guide this conclusion in the future. A series of "lessons learned" about user engagement and analysis of program outcomes will be discussed.

#31 BIOMARKERS FOR EARLY DETECTION AND DIAGNOSIS OF NASH-RELATED HEPATOCELLULAR CARCINOMA

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Hepatocellular carcinoma (HCC) is the most common type of primary liver malignancy, constituting about 90-95% of all hepatic cancers. It is the fastest-growing and second leading cause of cancer-related death worldwide. HCC has become a major and steadily increasing global health challenge mainly due to the metabolic cellular disturbances promoted by the epidemic of obesity and a paucity of biomarkers for its early detection, resulting in over 50% of HCCs being diagnosed at a late stage. Currently, alpha-fetoprotein (AFP) is the only biomarker (phase5) that has been approved for diagnosis and surveillance of HCC. AFP has a low sensitivity and poor specificity in detecting early HCC, thus warranting the ongoing search for better biomarkers for early diagnosis and surveillance of HCC in high-risk communities.

We hypothesized that proteins that play roles in the molecular pathogenesis of Non-alcoholic steatohepatitis (NASH) -related HCC, such as those involved in apoptosis and autophagy processes (Survivin, Smac-DIABLO, ATP1A1, Caspase -cleaved cytokeratin-18 fragment, LC3-11), metabolites, cell redox status markers (protein carbonyls and glutathione) and epigenetic modifications markers (H3K9 tri-methylation), could serve as putative plasma biomarkers for early detection and surveillance of NASH-related HCC. Furthermore, a combination of the above biomarkers candidates, integrated with AFP level could be used to develop a Liquid Biopsy panel (a scoring system) for effective early diagnosis, prognosis and surveillance of NASH-related HCC in high-risk population. Such a scoring system will allow for effective discrimination of the presence of HCC in livers with advanced fibrosis (cirrhosis).

Plasma concentration of proteins and markers were assayed via Enzyme-linked immunosorbent assay (ELISA), in both humans and animal models of NASH and NASH-HCC. Plasma metabolites (metabolomics) were measured using Liquid Chromatography-Mass Spectrometry (LC-MS) in a NASH mouse model. Significant differences among groups were established at $p<0.05$ using ANOVA, Turkey's post-hoc test and t-test.

Our data, shows that, in humans, the plasma level of survivin was significantly higher ($p<0.05$) in HCC patients compared to those with NASH and normal controls. Smac- Diablo was significantly elevated in NASH patients compared to normal controls ($p<0.05$) but was not different when compared to HCC patients. The plasma levels of other proteins and metabolites (Caspase -cleaved cytokeratin-18 fragment, LC3-11, H3K9 tri-methylation, protein carbonyls and glutathione) also showed variations between controls, NASH, and HCC patients, depicting them as biomarkers candidates alongside with SMAC and survivin for early detection of HCC in high risks population. Strikingly, we observed similar trend in the plasma levels of the assessed proteins in our NASH- HCC mouse model.

Our findings suggest that plasma survivin level could effectively discriminate between NASH and HCC patients. And could be used in concert with Smac-Diablo and other assessed proteins and metabolites to develop a scoring system, in combination with AFP, for early detection, diagnosis and surveillance of NASH -related hepatocellular in high-risk population.

#30 Stephanie Thompson

Prenatal Alcohol and Polysubstance Exposure Over a 5-year Period in Southern West Virginia

Purpose: Maternal alcohol and substance use during pregnancy with subsequent fetal exposure remains a profound public health challenge. Our goal was to investigate rates of prenatal alcohol exposure (PAE) over a 5-year period that included the COVID-19 pandemic using the alcohol biomarker, PEth, in conjunction with standard-of-care maternal and neonatal substance screening.

Methods: As part of a PAE study, 299 woman-newborn dyads were enrolled between 2018-2022. Newborn dried blood spot samples were collected within 48 hours of birth during routine newborn screening tests and analyzed for PEth concentrations. Polysubstance exposure was determined by maternal urine screens at 3rd trimester and time of delivery, and via neonatal cord toxicology.

Results: PEth screening had a PAE detection rate of 27% with the other most common detected substances being cotinine/nicotine (39%), THC/cannabis (21%), buprenorphine (7%), opioids (5%), and amphetamines (5%). Polysubstance exposure was common as 40% of neonates with positive PEth levels were also positive for cotinine/nicotine and 26% also positive for THC/cannabis. In addition, a sharp increase in the percentage of neonates positive for PAE occurred in 2020, with the PEth positivity rate significantly increased during the initial 6 months of COVID-19 (60%) compared to the prior 6 months (30%, $p = 0.04$). No other examined substances demonstrated a similar temporal pattern of increased rates during the COVID-19 period.

Conclusion: The COVID-19 pandemic associated with increased rates of PAE in our study. Polysubstance use in late pregnancy appeared to be common, especially among alcohol, nicotine, and cannabis.

#29 Nicole Stout

Introduction
As individuals live longer after cancer treatment oncologists look to primary care professionals (PCPs) to provide follow-up survivorship care. However, PCPs feel ill-prepared to manage cancer survivors needs.

Purpose
To understand PCPs knowledge and preferences in cancer survivorship care in West Virginia.

Methods
The *Survey of Physician Attitudes Regarding the Care of Cancer Survivors (SPARCCS)* was deployed electronically to WV PCPs. Respondents were asked to participate in 1:1 interviews. Interview transcripts were coded for emergent themes.

Results
58 complete surveys were analyzed. 41.4% were physicians, 48.3% nurse professionals. and 10.4% others (LSW, MA). 38% work in community health centers, 25.9% hospital-based, and 32.7% private practice. 27% felt *Very confident* managing follow-up surveillance for cancer recurrence, 12.1% were *very confident* managing cancer physical effects and 18.9% managing psychosocial effects. Agreement was high (>70%) that PCPs have the skills to monitor for disease recurrence; however respondents did not believe PCPs should have primary responsibility for survivorship care (61%).
11 interviews were conducted, identifying predominant survivorship care barriers of; lack of communication with oncology team regarding follow-up needs, low awareness of survivorship guidelines, lack of time to address all need domains. *"While I think we can handle the medical follow up…other things like nutrition, counselling, falls, cognition…that needs to be someone else."*

Conclusions
This seminal assessment of WV PCPs provides insight on long-term cancer survivorship care gaps. The growing survivor population and their multi-dimensional needs warrants future work to explore educational strategies and health care delivery models that improve survivorship care.

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#28 THE UTILITY OF ADDING DELTA SHOCK INDEX TO STANDARD TRAUMA TRIAGE CRITERIA: A NTDB ANALYSIS

James Bardes MD, Tanner Smida MS, Bradley Price PhD, Daniel Grabo MD, Alison Wilson MD

Introduction: Shock index (SI) and delta shock index (ΔSI) have shown utility identifying severe injury. Despite this, trauma team activation criteria (TTAC) do not include either. Using the National Trauma Data Bank, we aim to evaluate the effect of integrating ΔSI and SI in standard TTAC.
Methods: Retrospective cohort study using the NTDB database 2017-2020. Patients with missing vital sign data were excluded. Subjects in the dataset were queried for standard TTAC and positive need for trauma intervention (NFTI) defined as appropriately classified. SI was calculated as heart rate divided by systolic blood pressure. ΔSI was calculated as the change from prehospital SI to arrival SI. The accuracy for NFTI was determined from SI and ΔSI in conjunction with standard TTAC. To optimize this approach a classification tree using a recursive partitioning algorithm was utilized to identify optimal cutoffs for SI and ΔSI in TTAC.
Results: Over 911,000 patients were available for analysis. Using standard TTAC 69.5% were classified correctly, with the addition of SI or ΔSI we found no improvement in classification accuracy. Utilizing the classification tree (Figure 1) and focusing on patients without mechanistic or anatomic TTAC (n >759,000), the NFTI accuracy is 71.7%. This approximates to approximately 23,000 additional trauma team activations with over 13,000 correctly triaged.

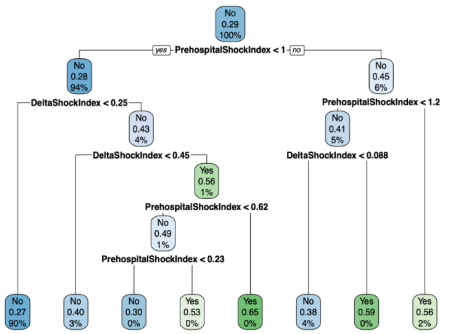

Figure 1. Classification tree
Nodes on left side of rule are in agreement

Conclusion: The use of both SI and ΔSI in conjunction should be considered for addition to TTAC. Individually neither value adds significant value as a TTAC. While the NTDB does have limitations in the number of vital sign values available, this study demonstrates that combining measurements of SI and ΔSI can achieve improvements in trauma triage. These findings call for additional study with more granular EMS datasets.

#27 David Scarisbrick

Cortical Morphology in Parkinson’s Disease and Neurocognitive Decline

Parkinson's disease (PD) is a neurodegenerative disorder that includes motor and cognitive changes throughout the course of the disease. Previous studies have suggested that compared to individuals with PD and no cognitive decline (PD-NC – Normal Cognition), individuals with PD and mild cognitive impairment (PD-MCI) exhibit reduced cortical thickness and brain volume using structural MRI. However, the specific patterns of cortical differences in PD-MCI compared to PD-NC are not fully elucidated. A broad range of cross-sectional studies have looked at the different regions of brain associated with cognitive decline in PD, and while heterogeneity exists, anterior/frontal lobe thickness measures are one area that has been related to the degree of cognitive change. This study aims to compare cortical morphology in PD-MCI and PD-NC individuals using high-resolution magnetic resonance imaging (MRI). We will use cortical surface-based metrics to examine differences in cortical thickness, gyrification, and volume in the frontal lobe. Secondarily, we will correlate cortical thickness, gyrification, and volume with a measure of executive function. Our findings may provide insights into MRI based biomarkers of cognitive impairment in PD and the potential functional impacts on neuropsychological assessment performance.

#26 Rachel Salyer

In 2014, research was identified as a relatively weak area in annual program evaluations. Few internal medicine (IM) residents were participating in research leading to publications, and participation/completion of Quality Improvement (QI), an ACGME program requirement, was inconsistent. We developed a resident research/QI curriculum to improve participation and scholarly productivity. We implemented the curriculum iteratively through a series of PDSA cycles. Didactics were developed and implemented in 2016, a resident research analyst/coordinator was hired in 2017, and additional clinicians joined the Resident Research/QI team in 2019. Currently, PGY-1 residents meet semi-monthly with the Resident Research/QI team to develop QI projects and learn research/QI principles. In meetings, residents learn to identify problems, refine ideas, review literature, develop study plans, and present QI study proposals to the department. Initially, research elective months and the number of IRBs were used as a proxy measure of resident research/QI scholarly activity. As curriculum infrastructure improved, so did scholarly productivity measurements: presentation number (and locality) and publications. In 2016-2017, 17.0% of residents participated in research electives; 13 IRBs were approved. The following academic year, research elective participation rose to 29.5%; residents reported 13 IRBs, 22 poster presentations, and 3 publications. For the 2021-2022 academic cycle, resident research/QI participation reached 55.1%: 78 IRBs, 53 poster presentations, 6 oral presentations, and 23 publications. By collaborating with faculty, prioritizing a team-based approach, and aligning QI ideas with hospital priorities and resources, our resident research/QI curriculum has enhanced IM resident scholarly development and output.

#25 Toni Rudisill

Police Officer's Opinions of Harm Reduction Programs in West Virginia

Background: Harm reduction programs (HRPs) could help substance users recover and commit fewer crimes. However, it is unknown whether HRPs are beneficial to law enforcement. The purpose of this study was to garner police officers' opinions of HRPs.

Methods: Semi-structured interviews were conducted with police from Jan-Feb 2023. Participants had to be ≥18 years of age and be currently employed as an officer within West Virginia. The interviews, which lasted ~40 minutes in duration, were conducted using a standardized script, audio recorded, and transcribed. Two researchers partook in a qualitative content analysis to determine emergent themes.

Results: Participants (N=11) were mainly ≥45 years of age (55%) with ≥25 years of enforcement experience (55%). Five themes emerged: 1) nature of police work, 2) perceived benefits of HRPs, 3) perceived detriments of HRPs, 4) need for education, 5) programmatic effectiveness and accessibility. Many officers felt HRPs could help them do their job as it could serve as an alternative to arrest for substance users and decrease drug use, crime, and infectious disease (i.e., improve safety). Conversely, officers felt HRPs could be detrimental if they were ineffective as they could draw more users into an area and increase crime. Officers also discussed how drug use and possession conflicts with their training (i.e., arrest if crime committed).

Conclusions: HRPs can positively and negatively impact police work. Officers are receptive to the idea of HRPs as they could be a resource. Officers want more education and data on HRP effectiveness and accessibility.

#24 Mary-Louise Risher

Adolescence is characterized as a period of increased social behavior, risk taking, and novelty seeking, partly due to ongoing maturation in critical brain areas and the hypothalamic-pituitary-adrenal (HPA) negative-feedback system. During this period there is heightened vulnerability to stress that can drive neuro-immune-endocrine remodeling, resulting in the emergence of maladaptive behaviors that increase susceptibility to alcohol and substance abuse. Here we used a rat model to investigate the impact of chronic adolescent unpredictable stress on a battery of behavioral measures to assess anxiety, novelty seeking, risk taking, depression, and voluntary ethanol consumption while determining whether the PPARγ agonist rosiglitazone can attenuate these effects. Adolescent female rats that experienced stress showed increased risk taking behavior and novelty seeking behavior with no change in ethanol consumption. The administration of rosiglitazone during stress induction attenuated stress-induced cortisol elevation, normalized risk taking behavior in a model anxiety, and attenuated novelty seeking in a task-specific manner. Depressive-like behavior was not impacted by adolescent unpredictable stress or the administration of rosiglitazone. The results from this study demonstrate that exposure to unpredictable stress during adolescence increases the prevalence of maladaptive behaviors that are known to increase susceptibility to alcohol and substance abuse, and that rosiglitazone may be an effective therapeutic to attenuate the emergence of select risk taking and novelty seeking behaviors in females.

#23 NORMALIZATION OF THE ATP1A1 SIGNALOSOME RESCINDS EPIGENETIC MODIFICATIONS AND INDUCES CELL AUTOPHAGY IN NASH-RELATED HCC

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Hepatocellular carcinoma (HCC) is the second leading cause of cancer-related death worldwide. In NASH related HCC, cellular redox imbalance from metabolic disturbances leads to dysregulation of the α1-subunit of the Na/K-ATPase (ATP1A1) signaling function. We have recently reported that normalization of such pathways exhibited tumor suppressor activity in HCC. Hence we hypothesized that the modulation of oxidative stress-mediated post-translational histone modifications and the regulation of autophagic process intermediated by the ATP1A1 signalosome may help to elucidate the significance of these changes in the development of tumor progression of HCC.

In vitro studies were done using two human HCC cell lines, complemented with i*n vivo* murine models of NASH-HCC and HCC-xenograft mouse model. Experimental groups were exposed to pNaKtide, a selective ATP1A1 signaling inhibitor. Acetylated/tri methylated H3K9, FoxO1 and cell autophagy were measured by ELISA, and immunofluorescence staining. Significant differences among groups were established at $p<0.01$ or $p<0.05$ using ANOVA/t-test.

Increased H3K9ac and H3K9me3 were associated with decreased cell autophagy in all experimental groups. Furthermore, inhibition of the pro-autophagic transcription factor FoxO1 was associated with elevated protein carbonylation and reduced glutathione in HCC. Interestingly, the normalization of the ATP1A1 signaling significantly decreased H3K9ac and H3K9me3, promoted nuclear localization of FoxO1, heightened cell autophagy, and promoted cancer-cell apoptotic activity in pNaKtide-treated cell lines and mice models.

In conclusion, the normalization of ATP1A1 signaling, by pNaKtide, modulates reactive oxygen intermediates, which may play a causative role in normalizing epigenetic histone modifications and restoring cell autophagy activity, and ultimately decreasing tumor progression in HCC.

#22 Development and Feasibility of Comprehensive Occupational Physical Activity Measurement for Cardiovascular Health

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Introduction: The WVCTSI research scholars program aims to accelerate and enhance the development of early-stage investigators at West Virginia University. This project is one of five that are currently in progress under the research scholars program.

Background: Leisure-time physical activity is known to have many cardiovascular health promoting effects, while some evidence suggests that occupational physical activity (OPA) may have paradoxically negative cardiovascular health effects. The public health impact of such negative effects would disproportionately effect blue-collar workers who may be highly physically active but not experience the benefits. Research examining these associations and their mechanisms of action is needed. However, prior to studying the health impacts of OPA in larger cohorts, valid measurements of OPA using high-quality objective monitors must be established. Importantly, such measurement methods must accurately differentiate across common OPA movement patterns (e.g., upper body, lower body, combination, etc.) as well as be feasible for workers to wear while performing physically demanding OPA.

Project Goal: Establish advanced methodology to comprehensively measure OPA exposure in future cohorts and enhanced understanding of the biological plausibility behind the paradoxical associations between OPA and health

Specific Aims:

Aim 1: Combine existing objective measures of lower and upper body PA to more accurately and comprehensively assess OPA exposure in a laboratory setting

Aim 2: Test and optimize the feasibility of the developed OPA measurement methodology for observational field research of OPA exposure

Aim 3: Explore associations between comprehensive OPA exposure, psychosocial stress, and adverse acute cardiovascular health responses in blue-collar workers

#21 John Pisquiy

ABSTRACT:

INTRODUCTION: The risk of post-operative complications in patients who had a positive COVID-19 test prior to a total joint arthroplasty (TJA) is unknown. The purpose of this investigation was to study the complications and mortality associated with a recent COVID-19 diagnosis in patients undergoing TJA.

METHODS: The National COVID-19 Cohort Collaborative (N3C) data enclave was used to identify all patients undergoing primary and revision total hip and knee arthroplasties. Patients were divided into COVID-19 positive and negative groups and the time from diagnosis was noted. The postoperative complications reviewed included the development of venous thromboembolism, pneumonia, acute myocardial infarction, readmission rates, and 30-day mortality rates.

RESULTS: A total of 85,047 patients undergoing elective TJA were included in this study, and 3,516 (4.13%) patients had a recent positive COVID-19 diagnosis. Patients diagnosed with COVID-19 two weeks prior to TJA were at increased risk of pneumonia (OR 2.46 (95% CI, $p=0.003$), acute myocardial infarction (OR 2.90, $p=0.007$), sepsis within 90 days (OR 2.63, $p=0.002$), and 30-day mortality (OR 10.6, $p<0.001$).

CONCLUSIONS: Patients with a recent COVID-19 diagnosis prior to TJA are at greater risk of post-operative complications including 30-day mortality. Our analysis presents critical data that should be considered prior to TJA in patients recently diagnosed with COVID-19.

LEVEL OF EVIDENCE: III

#20 Sydney Nassabeh

Electronic cigarettes (Ecigs) have been marketed as safer alternatives to traditional cigarettes. However, long-term health effects from maternal vaping on offspring cardiovascular function remains poorly understood. We tested the hypothesis that offspring aortic dysfunction would be greater from maternal vaping at high compared to low wattage vaping. Female Sprague-Dawley rats (N=25) were time-mated and randomly grouped into (N=5 dams per group): Ecig exposure at 5W or 30W and also with and without nicotine (50mg/ml). Control dams were exposed to ambient air. Whole-body exposure chamber was used with a total of 60-puffs/day (1.5hr/day, 5-days/wk) starting from gestational day(GD)2-4 to GD21. E-liquid was 50:50 vegetable glycerin:propylene glycol with no flavoring. Using wire-myography aortic reactivity (to methacholine, MCh; and sodium nitroprusside, SNP) was assessed in male and female from each dam at 1- and 3-months of age. In 1-month old offspring, no difference in MCh- or SNP-mediated dilation between air controls and 5W or 30W groups, with or without nicotine. However, at 3-months of age, impairment was seen in Ecig0-30W (no nicotine) compared to air-exposed controls (73±9%vs 94±2%, respectively; $p<0.001$). There was no difference in MCh dilation between air and Ecig0-5W (85±3%), Ecig50-5W (86±3%) or Ecig50-30W (85±3%). SNP dilation showed no differences at this age between any of the groups. This data suggests that there is a wattage-dependent decline in endothelial-dependent aortic function, which worsened by the addition of nicotine in adolescent offspring exposed to vape in utero. Maternal vaping during pregnancy can result in vascular dysfunction in adolescent life offspring.

#19 Amber Mills

Studies find cerebrovascular dysfunction in offspring with in-utero E-cig exposure, but the effect of wattage is unknown. We hypothesize that maternal vaping at high-vs-low-watts will have a greater effect on cerebrovascular function in offspring and nicotine would not further impact it. Pregnant rats were randomly assigned to 1-of-5-groups (n=5 dams/group) comprised of 5-watts with either 0mg or 50mg/ml nicotine (E-cig0-5w, Ecig50-5w), 30-watts (E-cig0-30w, Ecig50-30w), and air-exposed dams as controls. E-cig exposure consisted of 60puffs (1.5hr/day, 5-days/week) throughout the entire gestation using whole-body chambers. E-liquid was 50:50(VG,PG) without flavoring. Both offspring sex/per-dam are reported at 1-and-3-months, where the MCA reactivity was assessed using a dose-response (10^{-9}M to 10^{-4}M) to acetylcholine(ACh), sodium-nitroprusside(SNP) via pressure-myography. 1-month offspring, maximal MCA ACh-dilation was impaired in both Ecig0, 5-and-30-watts compared to air (33±3%,50±3%, respectively, with 30-watt having greater impairment. The Ecig50 offspring had similar impairment with ACh (Ecig50-5w:34±3%, Ecig50-30w:57±4%) compared to air controls, and 30w was greater. SNP response in Ecig0-5w and -30w showed blunted responses (20±6%,39±4%, respectively, with 30w further impaired. SNP response in Ecig50 group were impaired (5w=18±6%, 30w=27±3%) compared to controls, with 30w greater. 3-month offspring, ACh-dilation was impaired with Ecig0 (5w=32±3%, 30w=44±2%) and Ecig50 (5w=31±3%, 30w=50±2%) groups compared to controls. Only Ecig50 showed a wattage effect. SNP-dilation showed impairment for Ecig0 (5w=19±4% vs 30w=25±2%) and Ecig50 (5w=18±2% vs 26±4%) Ecig50 had greater 30w. Regardless of nicotine, both wattage impaired MCA reactivity. The magnitude of impairment was greater at higher wattage, but even low-wattage maternal-exposure indicates the threshold for harm is low. Significance($p<0.05$).

 # 18 Sydney Martinez

Background
Intestinal malrotation is a rare congenital condition with potentially devastating consequences due to potential volvulus and intestinal necrosis. Diagnosis is often delayed and long-term symptoms following surgical correction are poorly characterized. We developed the Intestinal Malrotation Patient Outcomes and WEllness Registry (IMPOWER), a national patient-generated registry (PGR), to capture data related to presenting symptoms, testing, diagnosis, treatment, and follow-up of individuals diagnosed with malrotation.

Results
Within the first two months, 354 patients with malrotation enrolled in IMPOWER, and 191 (53.9%) completed all baseline assessments. Nearly 90% of pediatric and 37.7% of adult participants experienced symptoms prior to diagnosis. Vomiting was the predominant symptom for pediatric participants compared to abdominal pain in adults. Yellow bilious emesis was more commonly reported than green, and volvulus at diagnosis occurred in 70% of pediatric and 27% of adult participants. More than 60% of pediatric and 80% of adult registrants reported gastrointestinal symptoms that persisted throughout the first year following their initial operation. Approximately 25% of registrants reported visiting four or more gastroenterologists for management of ongoing symptoms.

Conclusions
Fewer than half of pediatric patients presented with the “classic” green bilious colored emesis. Yellow bilious emesis was more commonly reported, and chronic gastrointestinal symptoms (i.e., abdominal pain, reflux, constipation, diarrhea) and feeding intolerance were common following surgical procedures for malrotation. This novel PGR highlights the need for a multicenter prospective registry to characterize the natural history and develop consistent standards of care related to the diagnosis, treatment, and long-term care for patients with malrotation.

17 Eric Lundstrom

In May 2016, the West Virginia (WV) state legislature enacted HB 4145, a law allowing concealed firearm carrying without a permit. A recent study found that state-level officer-involved shootings increase significantly following enactment of permitless carry, including in WV after passage of HB 4145. However, the law's impact on total firearm-related mortality in WV is unclear. Using data from CDC WONDER for 1999-2019, we assessed changes in annual firearm mortality rates following passage of HB 4145, both overall and stratified by variables of interest. Additionally, we used interrupted time series analysis (ITSA) with ARIMA modeling, which adjusts for seasonality and other serial data correlation, to quantify changes in monthly firearm deaths per 1,000 all-cause mortality in WV after passage of HB 4145. Annual firearm mortality was higher following enactment (17.7/100,000) than before (13.8/100,000); handgun deaths were significantly higher post-enactment (48% increase), while long gun deaths remained unchanged. ITSA found that monthly firearm mortality increased 15.8% ($p < 0.0001$) after enactment of HB 4145, while firearm sales showed no significant changes. These results may suggest HB 4145 increased rates of firearm-related mortality in WV without influencing gun ownership. Given previous literature demonstrating high rates of loaded firearm carrying in permitless carry states, changes in firearm mortality observed in this study may be due to increased exposure to firearms during violent conflicts in public. Firearm law changes resulting in increased public exposure to firearms are likely to increase overall firearm fatality risk, as opposed to improving public safety.

 # 16 HSPA9/mortalin inhibition disrupts erythroid maturation independent of TP53 in human hematopoietic progenitor cells

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Myelodysplastic syndromes (MDS) are a heterogeneous group of clonal hematopoietic stem cell malignancies characterized by abnormal hematopoietic cell maturation, increased apoptosis of bone marrow cells, and anemia. They are the most common myeloid blood cancers in American adults. The full cohort of gene mutations that contribute to the phenotypes or clinical symptoms observed in MDS patients is not fully understood. Up to 25% of MDS patients harbor an interstitial deletion on the long arm of chromosome 5 [del(5q)], creating haploinsufficiency for a large set of genes including HSPA9. The HSPA9 gene encodes for the protein mortalin, a highly conserved heat-shock chaperone protein predominantly presented in mitochondria in cells. Our prior study showed that knockdown of HSPA9 induces TP53-dependent apoptosis in human CD34+ hematopoietic progenitor cells. In this study, we explored the role of HSPA9 in regulating erythroid maturation using the same cell model. We inhibited the expression of HSPA9 by using both gene knockdown and an allosteric inhibitor. We found that inhibition of HSPA9 disrupted erythroid maturation as well as increased the expression of p53 in human CD34+ cells. Whole genome sequencing analysis found that del(5q) and TP53 gene mutations co-occur in MDS patients. In order to test whether the molecular mechanism of HSPA9 regulating erythroid maturation is TP53 dependent or not, we constructed short hairpin RNAs targeting the human HSPA9 and TP53 genes respectively to knockdown the two genes simultaneously in human CD34+ cells using double antibiotic selection with puromycin and hygromycin. We observed that

TP53 inhibition could not reverse the erythroid maturation disruption by HSPA9 inhibition, indicating the regulation of erythroid maturation by HSPA9 is probably through a TP53 independent mechanism. Collectively, these findings indicate that reduced levels of HSPA9 may contribute to anemia observed in del(5q)-associated MDS patients. The phenotypes such as apoptosis induction or erythroid maturation inhibition observed in patients caused by del(5q) genes haploinsufficiency may be specific gene dependent. The cooperation of multiple del(5q) genes and/or genes on other chromosomes (e.g., TP53) may be needed to induce the phenotypes observed in patients with MDS.

15 Wei Li

COVID-19 is accompanied by excessive vascular system dysfunction but the mechanism is unknown. Thymidine phosphorylase (TYMP), which is significantly increased in COVID-19 patients, plays an important role in platelet activation, thrombosis, and inflammation, in addition to its chemotactic effect on endothelial cells. We hypothesize that TYMP mediates SARS-CoV-2 Spike Protein (SP)-enhanced vascular dysfunction and enhances inflammation. TYMP is highly expressed in bronchial and type II alveolar epithelial cells. By treating BEAS-2B cells, a human bronchial epithelial cell line, with SP- or its receptor binding domain (RBD)-containing COS-7 cell lysates, we demonstrated that SP per se can significantly increase TYMP expression and activation of NF-κB and STAT3 signaling pathways. Using the ferric chloride-induced carotid artery injury thrombosis model and K18-hACE2TG mice, which are anti-thrombotic, we demonstrated that SP treatment dramatically enhanced thrombus formation, which was significantly inhibited by simultaneously feeding the mice with 1 mg/kg of tipiracil hydrochloride, a selective TYMP inhibitor. SP is more powerful than RBD in enhancing thrombosis, suggesting that in addition to its binding role to the host cells, SP may have an unrevealed pathophysiological function. This hypothesis is supported by treating mouse vascular smooth muscle cells (VSMCs) with SP, which reportedly does not efficiently bind to mouse ACE2, significantly inhibited wildtype VSMC proliferation, but has less effect on TYMP-deficient VSMC. Taken together, our study suggests that SARS-CoV-2 SP possesses unrecognized function and TYMP participates in SARS-CoV-2 SP-associated pathogenicity. Inhibition of TYMP could be a novel effective treatment for COVID-19 and attenuates COVID-19-associated complications.

 # 14 Kazuhiko Kido

Title: Implementing a telemedicine-led heart failure medication regimen optimization clinic in medically underserved heart failure populations through West Virginia Practice-Based Research Network: Study design and interim analysis

Introduction

West Virginia (WV) is a rural state; about 35.5% of residents live in non-metro areas. Health disparities in heart failure (HF) treatment occur mainly due to limited access to appropriate HF cares. Telemedicine visits solve the access problem to rural clinics if the self-measured blood pressure monitoring (SMBP) strategy can be implemented in the population. However, the most common barrier to implement this approach is that a significant number of medically underserved HF patients does not have access to validated SMBP devices. The provision of SMBP devices for patients with HF will help HF pharmacists perform telemedicine visits and initiate/adjust HF medications based on SMBP readings. The objective of this pilot study is to evaluate the clinical impact of telemedicine-led HF medication optimization clinic in medically underserved populations.

Methods

The pilot study utilizes multi-center prospective observational registry design detailing clinical course of each included patient with HF over a 6-month follow-up period. West Virginia University Medicine HF service or Community Care of West Virginia through WV Practice Research Network will enroll adult patients with HF. The primary outcome for HF with reduced ejection fraction is the use of all four guideline-directed medical therapy (GDMT) agents unless documented intolerances. Secondary outcomes include Kansas City Cardiomyopathy Questionnaire score, use of each GDMT agent, and achievement of target doses/maximum tolerated doses for each GDMT. The clinical study design and interim analysis results will be presented at the conference if the abstract is accepted.

#13 Kacie Kidd

Purpose
Gender diverse youth (GDY) and their families often present to pediatric primary care providers (PPCPs) seeking support. This population faces health inequities compared to cisgender peers. We aimed to understand the knowledge, attitudes, experiences, and needs of PPCPs in the Appalachian state of West Virginia (WV) with regard to caring for GDY.
Methods
A 76-item anonymous online survey was distributed to PPCPs across WV. The survey included questions measuring provider 1) knowledge about gender identity and gender-affirming interventions, 2) experiences and attitudes towards caring for GDY, 3) needed support to best care for GDY, and 4) demographics. Between-group differences were explored using t-tests.
Results
51 providers completed the survey and 60% were pediatrics or med-peds trained while 40% were family medicine trained. In total, 82% of providers noted a history of caring for one or more GDY (range 0-50) and 65% endorsed providing gender-affirming care. Only 20% acknowledged familiarity with standard of care guidelines and only one in ten answered 70% or more knowledge questions correctly. Being younger (<40 years) or being in practice for <10 years was significantly associated with higher knowledge ($p=0.02$, $p<0.01$) and attitude ($p<0.01$, $p<0.01$) scores.
Conclusions
PPCPs in WV endorsed seeing GDY in their practices while demonstrating and acknowledging knowledge gaps and, for some, displaying attitudes not in line with current standard of care guidelines. Given the high prevalence of gender diverse youth in this region, it is critical that PPCPs have access to education and consultative support in order to improve health outcomes for these vulnerable youth.

#12 Better Prediction of SARS-CoV-2 Incidence Through Enhanced Use of Public Health Data

Maryam Khodaverdi[1], Bradley S. Price[1,2], Brian Hendricks[1,3], Wes Kimble[1], Gordon S. Smith1[1,3], Sally L. Hodder[1]

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Objective

Objective of this study is to forecast top counties of West Virginia with highest number of positive COVID-19 cases. Our contribution is to incorporating dynamic situation of multiple variants, variability in testing rates, and introduction of vaccination in our forecast.

Method

Data provided through a partnership with the West Virginia Department of Health and Human Resources including all SARS-CoV-2 tests and vaccination data between Jan 2021-Mar 2022 aggregated to: SARS-CoV-2 cases by county and day per 10,000 residents, 7-day uptake of vaccination per 10,000 residents, and daily cumulative proportion of county residents who have received SARS-COV-2 vaccination. Other features such as past incidences, weekend, and holidays indicators, daily reproduction number, R_t values, calculated based on different serial intervals or rate of transmissions of Wuhan, Delta, and Omicron[1] were calculated and included to our model as well.

We implemented stacked long short term memory (LSTM) network trained by sliding window selections (7-day) to forecast next week's cases. LSTM networks are recursive neural net (RNN)[2] used to solve multivariate time series forecasting problems by weighting both long and short-term trends and recursive connections. We minimized mean square error with adaptive moment estimation optimizer, and tuned hyper-parameters with Bayesian optimization. Shapley Additive Explanations (SHAP) values are used to identify and quantify feature importance. The SHAP method is based on cooperative game theory, absolute SHAP value shows how much a single feature affected the prediction[3].

Result

Figure 1 and 2 show architects of our designed model and LSTM unites respectively. Table 1 presents results on comparison of the various models and feature sets described. Model with R_t of all variants, vaccination, and testing information has lower error rates across all MSE and MAE for both instances of counties above and below 10 cases per day. 7-day vaccination uptake and R_t values contributed more compared to other features.

Conclusion

LSTM networks can be used for short term trend prediction of COVID-19 trend. Utilizing real time public health metrics such as R_t of multiple variants improves accuracy of models that only look at past trend and provides better prediction. Another important take away is not only updating the data fed to machine learning model, but including relevant variables as become available, i.e new variant's R_t, improves the prediction.

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Figures and tables

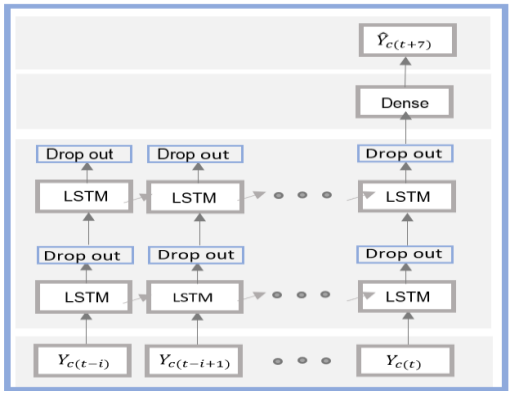

Figure 1- Stacked LSTM and dense layer

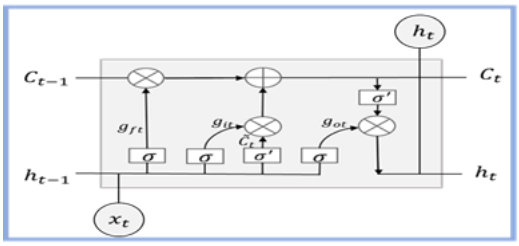

Figure 2- LSTM unit

Table 1 – Model comparison trained on 2021 data and evaluated on Q1 2022

Model Number	Feature Used in Model (Y/N)						
	R_t Alpha	R_t Delta	R_t Omicron	7-Day Vaccine Uptake	Cumulative Vaccine Rate (2 Doses)	Number of Tests Given	Daily Incidence Count
1	Y	Y	Y	Y	Y	Y	Y
2	Y	N	N	Y	Y	Y	Y
3	Y	N	N	Y	Y	Y	N
4	N	N	N	Y	Y	Y	N
5	Y	Y	Y	N	N	Y	N
6	Y	Y	Y	N	N	N	Y

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
MSE	425.1	544.55	688.3	818.89	484.38	533.59
MSE >10	784.5	1009.9	1277.15	1523.47	896.42	988.61
MAE	9.37	9.78	10.48	11.51	9.51	10.05
MAE >10	15.52	16.44	17.54	19.54	15.79	16.86
MPE>10	0.07	0.09	0.09	0.12	0.08	0.08

#11 Krystal Hughes

Flash nanoprecipitation (FNP) employs rapid turbulent millisecond mixing of an organic solvent phase (usually containing amphipathic polymer and hydrophobic payload) and a miscible aqueous solvent phase to produce monodispersed nanoparticles. pH-responsive delivery systems that are sensitive to acidic conditions enable the precise release of payloads from endolysosomes into the cytoplasm and prevent leakage of drugs at neutral pH (blood or extracellular spaces). Acetalated dextran (Ac-Dex) nanoparticles have been shown to exhibit higher sensitivity at acidic pH due to the presence of acid-labile acetal groups. Furthermore, Ac-Dex nanoparticles are synthesized using a naturally occurring polymer, dextran, which has greater biodegradability and biocompatibility. However, the current formulation strategy used to fabricate Ac-Dex nanoparticles requires the use of a multi-step, exothermic emulsion process, and toxic organic solvents such as chloroform or dichloromethane. Polyvinyl alcohol is widely used to stabilize Ac-Dex nanoparticles, but the incorporation of non-ionic surfactants such as Pluronic F-127 (F-127) or D-α-tocopheryl polyethylene glycol succinate (TPGS) as stabilizers may enhance the circulation times of Ac-Dex nanoparticles due to the presence of a polyethylene glycol component. We hypothesize that Ac-Dex nanoparticles could be efficiently stabilized using amphiphilic polymers with a rapid, scalable nanoprecipitation approach such as FNP. Here, we utilized a confined impingement jet (CIJ) mixer to fabricate Ac-Dex nanoparticles using simple, organic-solvent ethanol and F-127 or TPGS as stabilizers. We have then evaluated the encapsulation efficiency of a wide range of payloads and demonstrated pH-responsive release and intracellular uptake and release using model fluorophores.

 # 10 Brian Hendricks

Introduction. Previous studies highlight recent race/ethnic disparities in drug overdose mortality by sex at birth and race, as well as pre/post pandemic. Many of these studies have a limited sample size of time points, and are unable to characterize continuous change in mortality across time. **Objective.** The objective of this study is to conduct a time series regression to investigate the changing rate of overdose mortality by sex at birth and race over time. **Methods.** Sex and race-stratified monthly opioid overdose mortality counts for January 2018 to August 2022 were extracted from CDC WONDER; data for 2022 were provisional. Overall trends, as well as continuous change in overdose mortality over time were assessed using time series regression. **Results.** Among total individuals, the mean opioid-involved mortality rate was 40.5% higher for Black/African Americans compared to their white counterparts. Among males, black males (0.59, 95%CI = 0.32 to 0.87) had over three times the monthly increase in overdose mortality compared to white males (0.15, 95%CI = -0.12 to 0.43). **Conclusions.** Opioid involved mortality per 1,000 increased significantly among Black/African Americans, particularly among male Black/African Americans monthly from 2018 to 2022. Findings are consistent with past research which highlights this disparity by race and sex at birth. Unique to our study, the methodological approach provided an opportunity to characterize just how fast overdose mortality disparities are growing among sex at birth by race populations.

9 Mawia Haddad

Hepatitis C Virus (HCV) is the leading cause for liver cirrhosis, liver cancer, and liver transplant procedures in the United States. High prevalence of HCV cases has been reported among intravenous drug users. Patients who suffer from mental health issues are more prone to using illicit drugs, which in turn, amplifies the need to address HCV testing and treatment while a patient is receiving care in rehab and/or mental health facilities. Educating psychiatrists, mental healthcare providers, and social workers on HCV and its available treatment will lead to an increase in testing and treatment rates for HCV positive patients. The transmission rate of the virus will be reduced and eventually it will be eradicated when testing and treatment rates increase. An integrated healthcare model could be the answer to conquer HCV infection among people in mental health and substance abuse treatment facilities. This model could be implemented if healthcare providers were to receive training and education about HCV and its available treatment options. There are many hurdles that would need to be overcome for this hypothesis to be proven. Barriers that affect healthcare providers decisions on testing and treatment such as prejudice and stigma toward people who inject drugs (PWID), lack of funding, physician time constrains, medication side effects, relapse among PWID in which will result in reinfection, scarce insurance coverage, and lack of training and education on HCV are among the factors that preclude healthcare providers from testing and treating HCV patients. The aim of this study is to elevate healthcare providers awareness towards HCV and educate them about its prevalence, morbidity, mortality, and available treatment for HCV, which in turn will increase overall testing and treatment. Conducting this project, I anticipate raising the awareness of Hepatitis C Virus testing and treatment among health care practitioners in rehab and mental health care facilities, which will then have a huge impact on Hepatitis C Virus diagnosis and treatment rate in the state of West Virginia. To conquer this syndemic and achieve what the World Health Organization proposed about viral hepatitis elimination as a public health threat by 2030, HCV diagnosis and treatment should start at mental health facilities.

#8 Kristin Grogg

Physical inactivity is a global public health challenge. Clinicians are increasingly called upon to initiate and provide physical activity assessment and promotion with patients yet reports indicate less than one third of primary care visits include some type of physical activity counseling. The purpose of this review is to systematically examine randomized controlled trials (RCTs) that focused on physical activity assessment using activity monitors (e.g., pedometers, accelerometers) in clinical settings in the United States. A literature search was performed in six major databases (PubMed, Academic Search Complete, PsycINFO, CINAHL, SPORTDiscus, and Health Source) to extract published peer-reviewed studies from 2008 to 2022. Interventions with practicing health professionals who facilitated physical activity assessment and promotion with adult patients $\geq$18 years of age were included. Additionally, reference lists from these publications and systematic reviews were reviewed to identify studies that had not been previously identified. Studies were screened and coded based on the population, intervention, comparison, outcomes, and study setting (PICOS) framework from the Preferred Reporting Items for Systematic Reviews (PRISMA) statement. Risk of bias was assessed using the Cochrane Risk of Bias instrument for RCTs (ROB2). Independent, dual selection of studies and data abstraction was performed by two reviewers, and of 1,054 studies that were identified and screened for eligibility, 10 met eligibility criteria for inclusion. Preliminary data has been extracted and qualitative and quantitative analyses are currently underway.

#7 Mary Virginia Gibbs

Objective: To revisit and describe changes in the cervical cancer population from 2009-2019.

Methods: The SEER database 17 registries from 2000-2019 were reviewed to ascertain trends in invasive cervical cancer from 2009-2019. Estimated annual percent change (EAPC) in incidence rates and 95% confidence intervals (CI) over the entire study period were compared according to age, stage, race, and cell type (squamous [SCC] and adenocarcinoma [ACA]).

Results:
The EAPC of SCC is generally trending downwards, with significant changes among those with localized disease (-2.2%; 95% CI: -3.5 to -0.8), women ≥50 years of age (-1.6%; 95% CI: -2.2 to -1.1), black women (-1.6%; 95% CI: -2.6 to -0.5), and Asian or Pacific Islanders (-1.3%; 95% CI: -2.2 to -0.4). On the other hand, the EAPC of ACA is rising in all disease stages, those under age 50, Asian or pacific islanders and white women.

Conclusions: In the US, the population with cervical cancer continues to change. Since last delving into these population statistics, there has continued to be downward trends in the incidence of cervical cancer among pre and postmenopausal women, especially when considering localized SCC. This includes women of races that have historically had increased barriers to healthcare. Interestingly, the rates of ACA do not seem to follow this trend. As the field of oncology is rapidly changing, this opens an area for discourse and planning increase detection and treatment of non-squamous cervical cancer.

#6 Bradley End

Abstract

Tobacco use is the leading cause of preventable death in the United States, accounting for nearly 500,000 deaths per year. 16 million additional Americans are afflicted with a disease caused by smoking such as cancer, heart disease, stroke, and chronic lung disease. Despite this, nearly one quarter of West Virginians, almost double the national rate, are current cigarette smokers. West Virginia also leads the nation in rates of youth smoking and smoking during pregnancy in addition to high rates of smokeless tobacco use.

Despite decades of research, a paucity of data still exists as to best practices when considering ED based tobacco cessation interventions. As such, for this project we have the following specific aims and hypotheses:

Specific Aim 1: Identify pre-intervention perceived barriers to and attitudes towards an ED based tobacco cessation intervention and re-evaluate these perceptions post-intervention.
Hypothesis: Post-intervention perceptions of ED staff will demonstrate significant changes in perceived utility and time effectiveness of the ED tobacco cessation intervention. Patients will indicate being receptive towards ED-based tobacco cessation efforts and will have a favorable opinion of the intervention in post-study surveys.

Specific Aim 2: Compare the effectiveness of both point quit and continued abstinence rates between each arm of the protocol.
Hypothesis: Patients assigned to the nicotine replacement therapy + Quitline referral will have increased self-reported and biochemically confirmed point quit rates at 7 days, 1 month and 3 months and higher sustained abstinence rates at 6 months compared to the control arm (Quitline referral alone).

#5 Holly Cyphert

Polycystic ovary syndrome (PCOS) is a heterogenous disorder characterized by a reduction in fertility, dysmenorrhea, and metabolic dysfunction. Currently, the process of diagnosis can be arduous due to a lack of clear presentation, leading to years of reproductive uncertainty and pain. Here, we examined the possible use of bile acids as potential biomarkers for the disease state. Specifically, bile acids emulsify fat in the gut and act as signaling molecules. Bile acid diversity and accumulation is correlated with metabolic health and positive glucose metabolism. Subjects were recruited and stratified into groups based on BMI (a compounding factor of the disease) and PCOS status. Interestingly, taurocholic acid (TCA) and TDCA (tauro-deoxycholic acid) where elevated in PCOS subjects with obesity in comparison to controls without PCOS. Fibroblast growth factor 21 (FGF21), a metabolic regulator implemented in bile acid metabolism, was elevated in PCOS patients, and was positively correlated with TCA changes. These data in total support the notion of interplay between FGF21, bile acids, and testosterone in the early detection of PCOS and need to be further explored to possibly uncover an easier path to PCOS diagnosis.

#4 Katie Corcoran

Long-term Gastrointestinal Outcomes in Intestinal Malrotation Patients Following the Ladd Procedure

Abstract:

Background: Intestinal malrotation is a congenital birth defect that increases the risk of a life-threatening volvulus. The Ladd procedure is considered definitive corrective management for intestinal malrotation. Previous studies investigating post-Ladd procedure outcomes typically have focused only on surgical outcomes. There is scarce research examining long-term gastrointestinal outcomes after the Ladd procedure.

Methods: TriNetX is a global research network providing access to aggregated de-identified electronic medical records from 57 healthcare organizations globally, which allows researchers to examine medical outcomes for specific time periods after a defined index event. ICD-10 codes were utilized to pull gastrointestinal and related symptoms, radiological and surgical procedures, and medications at ≥ 6 months, ≥ 1 year, ≥ 3 years, and ≥ 5 years for intestinal malrotation patients after the Ladd procedure was performed.

Results: The overall analytic cohort included 812 patients (603 pediatric and 209 adult) from 37 healthcare organizations. Almost 80% of pediatric patients and 75% of adult patients experienced digestive and abdominal symptoms at 6 months or later following a diagnosis of intestinal malrotation and subsequent Ladd procedure. A majority (53% pediatric patients and 50% adult patients) had persistent digestive symptoms beyond 5 years after the Ladd procedure.

Conclusions: Results indicate that a large proportion of intestinal malrotation patients have gastrointestinal symptoms for years after the Ladd procedure is performed. These findings highlight the need for individual-level longitudinal studies to better understand the ongoing gastrointestinal symptoms among patients with intestinal malrotation and to determine factors associated with these symptoms after the Ladd procedure.

#3 Mariya Cherkasova

High-frequency repetitive transcranial magnetic stimulation (rTMS) has recently been approved by the FDA as a treatment for smoking cessation. It is, therefore, important to optimize rTMS treatment delivery for maximal efficiency and efficacy. This has been attempted through priming and pairing rTMS with cue exposure. Although rTMS-concurrent smoking cue exposure was observed to enhance the anti-craving effects of rTMS, there has been no research systematically examining which mental processes require engagement during cue exposure to maximize and optimize these effects. Our work in progress aims to evaluate the effect intentionally engaging two different mental processes during rTMS-concurrent smoking cue exposure: upregulation of craving by focusing on the immediate rewarding experience of smoking versus downregulation of craving by focusing on its long-term negative consequences. Smoking-dependent individuals will undergo 3 sessions of active 10Hz rTMS over the left dorsolateral prefrontal cortex paired with 3 different types of cue exposure conditions: 1) smoking cues with upregulation of craving; 2) smoking cues with downregulation of craving; 3) neutral cue exposure control. In all 3 conditions, rTMS will be immediately followed by functional magnetic resonance imaging, during which participants will again experience a cue exposure task with upregulation and downregulation of craving (as well as neutral cue exposure) and rate their cue-induced cravings. The effects of the different types of rTMS-concurrent priming on cravings and neural activity will be compared. Optimizing rTMS-concurrent priming and understanding its neural mechanisms will help improve treatment outcomes for people with smoking dependence.

#2 Effect of Coal Mining on health outcomes between Male and Female Miners

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Running Title: Effect of Coal Mining on health outcomes between Male and Female Miners
Total Number of Tables and Figures:

Both active and retired coal miners are still at a higher risk of developing cardiovascular disease as a result of coal dust and related health care factors [1]. But the rate of disease between male and female coal miners is not widely documented. We sought to compare male and female coal miners and their long-term health outcomes. Coal miners and other miners have an increased risk of cardiovascular and pulmonary issues with their work [2]. An added barrier to the health care of miners especially in Southern West Virginia is the access to health care and advanced health care in their communities [3].

We identified (n=2,460) cases of coal miners with (n=2,280) being male and (n=180) being female. We queried the data warehouse from September 1st, 2016, to Jan 1st, 2023, to identify any coal miners coming to the center for any treatment. We identified adult patients aged 18-90 years with at least one visit to a clinic in the CAMC system. Patients were divided into Male and Female. These cohorts were analyzed for differences in mortality, ischemic heart disease, heart failure, cancer diagnosis, mental behavioral diagnosis. Descriptive statistics were used to measure associations and to create a Kaplan-Meier survival curves to assess the endpoints.

Male coal miners had a higher mortality at (8.3% vs 5.5%, P=0.19) compared to females a log rank test was (88.6% vs 92.7%, P=0.03) at 3 years, ischemic heart disease was higher in men at (40.3% vs 16.6%, P<0.001) compared to females a log rank test was (46.9% vs 78.2%, P<0.001) at 3 years. Heart Failure was also higher in the male coal miners at (17.9% vs 5.5%, P<0.001) with a log rank of (75.8% vs 93.4%, P<0.001). Cancer rates were also higher in the male group (40.3% vs 33.3%, P=0.06) with a log rank of (44.2% vs 51.3%, P=0.01). Mental health diagnosis was lower in female coal miners (34.2% vs 55.5%, P<0.001) compared to Male

coal miners a log rank test was (53.6% vs 29.6%, P<0.001). The average age of a male coal miner was higher (61.8±16.9 vs 43.4± 17.7, P<0.001) compared to female coal miner.

In conclusion it appears that sex difference between male and females mirror large national trends and could indicate different proximity to mines and other toxicology-based exposure. It is important to evaluate differing distance and patient history in coal mining populations as well as access issues associated with coal mining.

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#1 Marie Abate

Buprenorphine is an important therapy for opioid use disorder (OUD) and may reduce fatal overdose risk in fentanyl exposures. However, buprenorphine's role in reducing this risk has not been quantified. This study examined the association between buprenorphine presence, decedent characteristics, and other factors with predicted fentanyl concentrations in overdose deaths. Unintentional fentanyl overdose decedents (n = 3,036) were identified from the West Virginia Forensic Drug Database, 2011 through mid-2020. A multiple linear regression model examined the association of fentanyl concentrations with buprenorphine presence based on concentrations of buprenorphine (B) and its metabolite, norbuprenorphine (N), adjusting for demographics, toxicological characteristics (presence of multiple opioids, benzodiazepines, stimulants, marijuana, alcohol), and comorbidities. A B/N concentration ratio <1 was used to indirectly indicate sustained buprenorphine exposure prior to overdose death. The median fentanyl concentration was 65% higher when buprenorphine was present (N=168) vs. absent (N=2,868) (0.028 vs. 0.017 μg/mL, $p < .001$). There were statistically significant associations between buprenorphine presence and increased fentanyl concentrations (+28.7%) with a B/N ratio <1. Obesity, male sex, alcohol, and comorbid cardiovascular diseases were significantly associated with lower (-11.3% to -20.7%) fentanyl concentrations; marijuana presence and a history of substance use disorder were associated with significant higher fentanyl concentrations (+8.8% to +31.3%). In conclusion, sustained buprenorphine use might exert some protective effect on fentanyl-related deaths as indicated by the association of higher fentanyl blood concentrations with buprenorphine. Buprenorphine is a vital tool for effective OUD treatment that might also reduce the risk of fatality in an acute fentanyl exposure.