reduces the activity of glutathione peroxidase 1 (GPX1), is associated with brain OS in patients with ME/CFS. METHODS/STUDY POPULATION: Study population: The study enrolled 20 patients with ME/CFS diagnosed according to Canadian Consensus Criteria, and 11 healthy control (HC) subjects. Genotyping: DNA was extracted from whole blood samples, amplified by PCR, and purified. Sanger sequencing was used for genotyping. 1H MRS: Proton magnetic resonance spectroscopy (1H MRS) was used to measure levels of glutathione (GSH)â€" a primary tissue antioxidant and OS markerâ€" in a 3x3x2 cm3 occipital cortex (OCC) voxel. GSH spectra were recorded in 15 minutes with the standard J-editing technique. The resulting GSH peak area was normalized to tissue water level in the voxel. Statistical Analysis: T-tests were used to compare OCC GSH levels between ME/CFS and HC groups, and between the study's genotype groups (group 1: CC, group 2: combined TC and TT). RESULTS/ANTICIPATED RESULTS: Clinical characteristics: ME/CFS and HC groups were comparable on age and BMI but not on sex ($p = 0.038$). Genotype frequencies: Genotype frequencies in the ME/CFS group were 0.55 (CC), 0.25 (TC) and 0.2 (TT); and 0.636 (CC), 0.364 (TC), and 0 (TT) in the HC group. GSH levels: There was a trend-level lower mean OCC GSH in ME/CFS than in HC (0.0015 vs 0.0017; $p = 0.076$). GSH levels by genotype group interaction: Within the ME/CFS group but not in the combined ME/CFS and HC group or HC group alone, GSH levels were lower in the TC and TT genotypes than in CC genotypes (0.00143 vs 0.00164; $p = 0.018$). DISCUSSION/SIGNIFICANCE: This study found that the presence of a C>T SNP in GPX1 is associated with lower mean GSH levels and, hence, brain oxidative stress, in ME/CFS patients. If validated in a larger cohort, this finding may support targeted antioxidant therapy based on their genotype as a potentially effective treatment for patients with ME/CFS.

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Financial Toxicity in Dementia Caregiving

Danielle M. Hart, Brandon Leggins, Clara Sanches, Winston Chiong
University of California, San Francisco

OBJECTIVES/GOALS: Financial toxicity describes the adverse effects of medical expenses on financial security and health related quality of life. Though dementia caregiving carries serious costs, financial toxicity has not been studied in this context. Here we assess the prevalence of financial toxicity in dementia caregiving and its sociodemographic correlates. METHODS/STUDY POPULATION: We utilized the COmprehensive Score for financial Toxicity (COST)â€" 12-item questionnaire validated to quantify financial toxicity in patients and their caregiversâ€" to conduct a nationally representative survey of 317 US dementia caregivers, oversampling non-Hispanic Black ($n = 75$) and Hispanic ($n = 61$) caregivers. Participants were required to be currently providing unpaid care to someone 50 years or older with dementia. Financial toxicity was defined as COST 0 & RESULTS/ANTICIPATED RESULTS: COST scores ranged between 0 and 44, with a survey-weighted mean of 24.57 and standard deviation of 9.8. Weighted analysis revealed 52.7% of American dementia caregivers experience some degree of financial toxicity. Of those who experience financial toxicity, 73.1% are classified as mild, 25.7% as moderate, and 1.2% as severe. Financial toxicity was identified in 69.5% of non-Hispanic Black, 54.1% of Hispanic, and 42.3% of non-Hispanic White caregivers, with non-Hispanic Black caregivers significantly more likely to experience financial toxicity compared to their non-Hispanic White counterparts ($p = 0.017$). DISCUSSION/SIGNIFICANCE: Most US dementia caregivers experience financial toxicity, though prevalence varies significantly by caregiver race. Discerning the pervasiveness of financial toxicity in this population and significant correlates will inform the development and expedient delivery of resources for patients and families.

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Impact of COVID-19 Pandemic on Oral Cleft Services in Puerto Rico

Dr. Yinayra Victoria, Dr. Carmen Buxo, Dr. Augusto Elias, Dr. Natalio Debs
University of Puerto Rico

OBJECTIVES/GOALS: Evaluate the impact of COVID-19 on oral clefts services including surgical and dental treatments in Puerto Rico. METHODS/STUDY POPULATION: This Observational retrospective cohort study will consider patients 0-21 y/o with CL/P that visited the UPR school of Dental Medicine, Pediatric University Hospital Dr. Antonio Ortiz and ongoing case-control research project Face-Genes. Records to be used are classified as follow: Pandemic (March 15, 2020 to March 15 2022) Pre-pandemic (March 15, 2015 to March 15, 2017) Power analysis (power=0.80 alpha=0.05) will be calculated. Unavailable and incomplete medical records and those that did not attended study clinic during study period will be excluded. Data extraction instrument will be based on previous published study. Descriptive statistics, Chi-square, Odds Ratios at 95% confidence intervals and multiple logistic regression will be estimated. RESULTS/ANTICIPATED RESULTS: We hypothesize that surgical and dental services in Puerto Rico will be adversely impacted because of COVID-19 pandemic. DISCUSSION/SIGNIFICANCE: CL/P are common congenital diseases that require early interdisciplinary attention. Lack of timely care as well as surgery and treatment delays, could be associated with poorer prognosis, increased morbidity and mortality. If there is high risk of dh services during emergency situations, our findings will help to allocate the available resources

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Incidence and Risk Factors for Comorbidities Following COVID-19 Disease in People Living with HIV

Cecilia Castellano, Caitlin Moran, Minh Nguyen, Cecile Lahiri, Emory University

OBJECTIVES/GOALS: COVID-19 disproportionately affects patients with prior health conditions and those living at a lower socioeconomic status. Persons living with HIV (PLWH) are infected with SARS-CoV-2 at a higher rate than seronegative patients. Risk factors and incidence of post-COVID-19 comorbidities in PLWH, specifically, are still unknown METHODS/STUDY POPULATION: We will study PLWH enrolled in the Emory Centers for AIDS Research (CFAR) Registry who receive care at the Grady Ponce de Leon Center in Atlanta, Georgia to 1) investigate the incidence of, and 2) identify risk factors that predispose PLWH to post-COVID-19 comorbidities. All PLWH with documented COVID-19 (by positive SARS-CoV-2 PCR or antigen test) between March 1, 2020, and September 30, 2021, with a clinic visit within 12 months will be included. We will identify comorbidities using problem list diagnoses and ICD9/10 codes. With a predicted sample size of 395, we will use a Cox proportional hazards model for time-to-detection of comorbidity, and bivariate and

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multivariate logistic regression models to identify predictors of incident comorbidity within 12 months of COVID-19. RESULTS/ANTICIPATED RESULTS: o Previous work demonstrated that in PLWH, age and non-AIDS comorbidities, but not HIV-related factors, were associated with hospitalization for COVID-19 in a dose dependent fashion.18 We anticipate that rate of incident comorbidities will be significantly higher in PLWH after COVID-19 compared to PLWH without a history of COVID-19. We also expect that pre-existing comorbidities including obesity and cardiovascular disease, male sex, Black race, and older age are associated with higher incidence of post-COVID-19 comorbidities in PLWH. When stratifying by organ system, we also anticipate that prior comorbidities of an organ system will predispose patients to later complications of that same system. DISCUSSION/SIGNIFICANCE: By understanding the incidence and risk factors associated with developing post-COVID-19 comorbidities, we can improve guidelines for treatment of groups experiencing the disproportionate impact of co-infection with HIV and SARS-CoV-2.

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Insomnia and Depression Trajectories in Women with and without Breast Cancer: Protective Effects of Satisfying Relationships

Rosie Shrout[1], Megan E. Renna[2], Annelise Madison[3], Janice K. Kiecolt-Glaser[3]
[1]Purdue University [2]University of Southern Mississippi [3]Ohio State University

OBJECTIVES/GOALS: Breast cancer survivors have a high risk for chronic disease and early mortality, especially if their psychological and physical symptoms persist beyond treatment. We compared survivors'and noncancer patient controls'health trajectories. We also examined how their relationship satisfactionâ€"a key health determinantâ€"impacted their health. METHODS/STUDY POPULATION: In this longitudinal study, participants were women who were married/domestic partners with an initial suggestive test of cancer identified at cancer clinics. After follow-up testing, women received either a malignant diagnosis (cancer survivors; n=139, stages 0–IIIC) or benign diagnosis (noncancer patient controls; n=69). Breast cancer survivors completed a baseline visit prior to beginning cancer treatment and two follow-up visits 6 and 18 months after treatment ended (surgery, radiation, or chemotherapy, whichever came last); noncancer patient controls completed visits within a comparable timeframe. At each visit, all women completed self-report questionnaires assessing their relationship satisfaction, insomnia, and depressive symptoms. RESULTS/ANTICIPATED RESULTS: We used mixed models and adjusted for participant age, comorbidities, cancer treatment and stage, BMI, and menopause status. At the pre-treatment visit, cancer survivors reported greater depressive symptoms than noncancer patient controls. Cancer survivors'depressive symptoms also decreased over time and were higher before treatment than at the 6- and 18-month post-treatment visits. Insomnia in cancer survivors, but not noncancer patient controls, decreased over time: insomnia was higher at the pre-treatment and 6-months post-treatment visits relative to the 18-month post-treatment visit. Survivors, but not noncancer patient controls, had lower depressive symptoms and insomnia at visits when they reported higher satisfaction than at visits when they reported lower satisfaction. DISCUSSION/SIGNIFICANCE: Cancer survivors had poorer psychological health than those without cancer before treatment, but survivors'psychological and physical health improved after finishing treatment. Survivors'satisfying relationships predicted better psychological and physical health, demonstrating the notable health benefits of survivors'relationships.

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Integrating a Research Ethics Program within an Academic Health Science Center

Jeffrey S. Farroni, Victoria H. McNamara, Elise Smith
University of Texas Medical Branch at Galveston

OBJECTIVES/GOALS: Research ethics services are critical to the clinical, research, and educational missions of an academic health science center. Our ethics program aims to develop a culture where investigators are as intellectually engaged in ethical issues of scientific integrity as they are in study design, data collection, and implementation. METHODS/STUDY POPULATION: This descriptive analysis depicts the historical development, from 2010 to 2022, of our research ethics program as an exemplar of ethics integration into the research enterprise of an academic health science center that engages in translational research. In this culture, clinicians, translational researchers and their scientific peers, research participants, and community members become involved in ethics investigation, deliberation, and innovation. RESULTS/ANTICIPATED RESULTS: There are four pillars to our research ethics program: 1) research ethics consultation service, which fosters the development of ethical best practices and standards for the practice of translational research; 2) education, which provides customized training and educational opportunities in research ethics to diverse stakeholders; 3) leadership, through collaboration and partnerships; 4) scholarly engagement, in the pursuit of innovative ethics research and professional development. Through these initiatives we can engage a broad constituency of stakeholders, become an integral component of research oversight, engage as active participants in the research enterprise, and have a critical role in guiding institutional culture. DISCUSSION/SIGNIFICANCE: The integration of our ethics program mirrors the translational science continuum which promotes the multidirectional flow of ideas among ethics consultants, laboratory/clinical scientists, implementation researchers and the community.

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Interactions between buprenorphine and norbuprenorphine in neonatal opioid withdrawal syndrome*

Julia Tobacyk[1], Brian J. Parks[2], Lori Coward[3], Michael D. Berquist[2], Gregory S. Gorman[3], Lisa K. Brents[2]
[1]University of Arkansas for Medical Sciences [2]University of Arkansas for Medical Sciences in Little Rock, AR [3]McWhorter School of Pharmacy at Samford University in Birmingham, AL

OBJECTIVES/GOALS: Buprenorphine (BUP) is used for opioid use disorder during pregnancy but causes neonatal opioid withdrawal syndrome (NOWS). The goal of this study was to determine the contribution of the active metabolite, norbuprenorphine (NorBUP), to the development of NOWS when the parent drug, BUP, is administered during pregnancy. METHODS/STUDY POPULATION: Subcutaneously implanted osmotic minipumps delivered BUP (0, 0.01, 0.1 or 1 mg/kg/day) ± NorBUP (1 mg/kg/day) to pregnant Long-Evans rats from gestation day 9 until after delivery. NOWS was measured between 3 and 12 hours after delivery. Withdrawal was precipitated by an intraperitoneal injection of a mu opioid

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