modifiable environmental factor. If pesticides are found to alter the immune response to COVID-19 infection and vaccination, these data will provide an evidence base for efforts to reduce pesticide exposure in children.

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Why are Black and Mexican American children more vulnerable than White children to upper respiratory viral infection?

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OBJECTIVES/GOALS: There is an excess risk of upper respiratory infection (URI) among Black and Mexican-American children in the US. Factors that underpin these disparities are largely unknown. We evaluated the extent to which socioeconomic status (SES), serum cotinine, obesity, and household size explained the association between race/ethnicity and URI. METHODS/STUDY POPULATION: We studied children, 6-17 years of age, who identified as Black, Mexican-American, or White in the National Health and Nutritional Examination Survey (2007-2012). URI was defined as a self-reported cough, cold, phlegm, runny nose, or other respiratory illness (excluding hay fever and allergies) in the past 7 days. The proportion of the association between race/ethnicity and URI explained by SES, serum cotinine, obesity, and household size was estimated as the average causal mediation effect (i.e., the indirect effect of race/ethnicity via the mediator) divided by the total effect of race/ethnicity. The average causal mediation effect was derived from survey weighted logistic regression models adjusted for age and sex. RESULTS/ANTICIPATED RESULTS: Black children were nearly 40% and Mexican American children were ~60% more likely to report a URI than those who identified as White (OR, 1.37; 95% CI, 1.06-1.77 and OR, 1.61; 95% CI, 1.21-2.13, respectively). Lower SES explained ~25% of the association between Black and Mexican American identity and URI (percent mediated 24.7; 95% CI, 23.0-26.6 and 26.1; 95% CI, 24.2-28.2, respectively). Obesity explained ~7% of the association between Black and Mexican-American identity and URI (percent mediated, 7.6; 95% CI, 7.3-8.0 and percent mediated, 6.7; 95% CI, 6.4-6.9, respectively). Nicotine exposure explained 8% of the association between Black identity and URI (percent mediated, 7.9; 95% CI, 5.6-10.1). DISCUSSION/SIGNIFICANCE: Lower SES explained a quarter of the association between race/ethnicity and URI. Low SES is a broad concept that may work through different mechanisms to lead to disparities in URI by race/ethnicity. Future research is needed to better understand these mechanisms and to identify modifiable aspects that can serve as targets for intervention.

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School Shootings and Mental Health in the United States

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OBJECTIVES/GOALS: It is estimated that 357,000 children have experienced a school shooting since 1999, yet due to limitations in the firearm violence field broadly, the sequalae are not well understood. The objective of this work is to examine the mental health impacts of school shootings, providing insight into the lasting effects of firearm violence on our communities. METHODS/STUDY POPULATION: We will first conduct a quasi-experimental study using controlled interrupted time series with repeated cross-sectional data to assess school shootings' impact on US mental health. School shooting data is from the K-12 School Shooting Database, and mental health data will be collected via the Behavioral Risk Factor Surveillance System. Second, we will conduct focus groups with community organizations, school administrators, and the public. Interview guides will be developed to explore the mental health impacts of school shootings, to guide the quantitative results interpretation, and assess educational materials' usefulness. Qualitative analysis will occur in NVivo software with codebook refinement through thematic analysis. Results will be triangulated through convergence coding. RESULTS/ANTICIPATED RESULTS: This research is situated within the context of the pervasive mental health challenges in the US, where mental illness poses significant health, social, and economic burdens. Thus, we anticipate finding an association between school shootings and decreased self-reported mental well-being among US adults. Literature suggests that there may be a stronger association among specific subgroups, such as parents with school-aged children or individuals living in close proximity to such incidents. We expect to find heterogeneity in the effect estimate based on school shooting attributes, such as the number of casualties. Through focus groups, we anticipate furthering our comprehension of the broad-ranging effects of school shootings on less quantifiable outcomes and the unique trajectories of recovery. DISCUSSION/SIGNIFICANCE: This project will contribute needed information on the impact of school shootings and mental health and assist in reducing the frequency and impact of school shootings. Furthermore, we aim to extend our findings beyond the scientific community, translating them into educational resources advocating for policy and public health interventions.

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Identifying Geographic Clusters of H. pylori Associated Metastatic Early-Onset Gastric Cancer: A case-control study in Los Angeles

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OBJECTIVES/GOALS: More young adults (age <50 years) are diagnosed with metastatic gastric cancer (mGC) every year. We will evaluate the association between environmental risk factors (including historical racial residential segregation) clinical, pathologic, molecular features and H.pylori associated early-onset mGC (mE-GC). METHODS/STUDY POPULATION: This retrospective matched case-control study of patients (1:2 by diagnosis year) with mGC (early-onset [E-GC; <50 years]; vs older-onset [O-GC; >50 years]) from 2000-2022 from the Los Angeles Cancer Surveillance Program (LA-CSP) will be enriched by a chart-abstracted cohort from USC Norris Comprehensive Cancer (NCCC). This annotated database captures sociodemographic, medical, and pathologic features of patients treated for mGC at NCCC. It will link to LA-CSP data exploring neighborhood features (obesity rate, poverty,

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insurance, access to care, ethnic enclave, historical segregation, etc.) of cases and controls to identify, characterize, and compare geographic "hotspot" neighborhoods of mE-GC. We hypothesize younger Hispanic and Asian patients are at higher risk of H.pylori associated mGC. RESULTS/ANTICIPATED RESULTS: From 2000-2022, 339 patients (mE-GC n = 113; mO-GC n=226) were treated at NCCC. We will have characterized clinical and pathological features of mE-GC vs mO-GC. We determined the proportion of H. pylori associated mE-GC vs mO-GC. We will have established the geographical distribution of patients with mE-GC vs mO-GC to identify high-risk neighborhoods. We will link neighborhood risk factors such as food scarcity, poverty, health care access, ethnic enclaves, to the distinct clinical and pathological features of mE-GC, including H. pylori status. Descriptive statistics, chi-square, t-tests, and multivariable regression will be used to compare mE-GC to mO-GC. After controlling for underlying demographics and tumor features, we anticipate clusters of mE-GC and mO-GC in areas of historical racial segregation. DISCUSSION/SIGNIFICANCE: Linking neighborhood and individual risk factors for mE-GC will inform early detection and prevention efforts for vulnerable individuals in high-risk neighborhoods. Building community partnerships within these neighborhoods is essential for developing interventions targeting H. pylori treatment to reduce health disparities in mE-GC.

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Impact of ACTIV-6 treatment on PROMIS-29 at 7, 14, 28, and 90 days

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OBJECTIVES/GOALS: As mortality and morbidity from acute COVID-19 decline, the impact of COVID-19 on short- and long-term quality of life (QoL) becomes critical to address. We assessed the impact of re-purposed COVID-19 therapies on QoL as a secondary outcome measure in ACTIV-6, a decentralized platform trial. METHODS/STUDY POPULATION: Adults aged ≥30 with mild-to-moderate COVID-19 enroll in ACTIV-6 online or through a study site. Patients are randomized to a medication of interest or placebo. Medications are mailed and symptoms are tracked using electronic diaries. QoL is measured#_msocom_1 using the PROMIS-29 questionnaire. Adjusted Bayesian logistic regression models are used to measure effects of treatment on the seven PROMIS-29 QoL domains at days 7, 14, 28#_msocom_2 and 90. Covariates are treatment, age, gender, symptom duration and severity, vaccination status, geographic region, call center#_msocom_3#_msocom_4, and calendar time. Treatment effects are described using ORs, 95% credible intervals, and posterior probabilities of efficacy, P(eff). RESULTS/ANTICIPATED RESULTS: There are 5,362 patients included, representing four of the study arms in ACTIV-6. We report results where P(eff)<0.025 and P(eff)>0.975 in the table below. Table 1. Scale Day: OR* (95% credible interval, P(eff)) Therapy Physical Anxiety Depression Fatigue Sleep Social Pain Ivermectin 400 — Ivermectin 600 D7: 0.77 (0.61-0.96, 0.01) D14: 0.65 (0.49-0.85, <0.01) D28: 0.69 (0.52-0.92, 0.01) — D7: 0.79 (0.64-0.97, 0.01) — D14 0.78 (0.60-1.00, 0.02) D28: 0.66 (0.50-0.87, <0.01) Fluticasone - D14: 0.77 (0.60-0.99, 0.02) — D7: 0.76 (0.62-0.93, <0.01) D90: 0.79 (0.64-0.98, 0.01) — D7: 0.74 (0.59-0.93, 0.01) Fluvoxamine D7: 0.66 (0.51-0.84, 0.01) — D28: 1.38 (1.02, 1.85, 0.98) D7: 0.78 (0.63-0.97, 0.01) D7: 0.77 (0.62-0.95, 0.01) — *OR > 1 favors active intervention DISCUSSION/SIGNIFICANCE: Results suggest fluvoxamine may improve depression scores by day 28, while placebo is favored in several other scales across treatments. Differences between treatment and placebo are not seen at most other timepoints. This trial is ongoing and future work will include results from additional ACTIV-6 study arms.

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Utilizing a Digital Phenotype for Metabolic Syndrome to Elucidate Risk Profiles for Neurocognitive Disease: An Electronic Medical Record Study

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OBJECTIVES/GOALS: Metabolic syndrome (MetS), defined as a cluster of cardiometabolic disease risk factors, is seldom coded using the ICD-10 system in electronic medical records (EMR). The goal of this study was to use EMR to construct MetS with a digital phenotype to amplify the pool of patients available to assess risk for neurocognitive disease in this population. METHODS/STUDY POPULATION: A digital phenotype using the EMR platform TriNetX (n=38 million patients between age 50 and 80) was created by clustering codes for the individual components of MetS (insulin resistance, hypertension, dyslipidemia, and central adiposity). The research network database on TriNetX was utilized to elucidate risk ratios for neurocognitive decline, Alzheimer's disease and related dementias (ADRDs), and cerebrovascular disease between a preclinical sample of older adults with and without MetS. Propensity score matching was used to match cohorts on demographic variables, medication use, and relevant comorbidities. Risk ratios (RR) and confidence intervals (95% CI) were presented for all outcomes. RESULTS/ANTICIPATED RESULTS: The digital phenotype for MetS expanded the sample from 29,830 to 274,703, a 10-fold increase. Sensitivity to the standard MetS ICD-10 code was 95.1%, showing strong agreement between coding schema. Older adults with MetS had higher risk of cognitive decline (RR: 1.30, 95% CI: 1.15–1.48, p <0.001), ADRDs (RR: 1.48, 95% CI: 1.25–1.75, p <0.001), and cerebrovascular issues (RR: 1.62, 95% CI: 1.55–1.70, p <0.001) when controlling for demographics, medication, and comorbidities. MetS individuals with cerebrovascular dysfunction had even greater risks for neurocognitive decline (RR: 1.70, 95% CI: 1.38–2.08, p < 0.001) and ADRDs (RR: 2.09, 95% CI: 1.56–2.80, p < 0.001) than those with only MetS. DISCUSSION/SIGNIFICANCE: Implementing a digital MetS phenotype in EMR effectively increased sample size and power for analyses. Older adults with MetS have higher risk for neurocognitive decline, especially among those with cerebrovascular dysfunction, highlighting a critical intervention window prior to overt cardiometabolic disease.

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