

between fear of COVID-19 infection, demographic variables, and care-seeking behaviors. Multivariable logistic regression modeled associations between fear of COVID-19 infection and care-seeking behaviors. RESULTS/ANTICIPATED RESULTS: Adjusted multivariable logistic regression revealed a statistically significant association between fear of COVID-19 infection and having a provider visit; AYA who feared COVID-19 were at greater than two times increased odds of a provider visit compared to AYA who did not fear COVID-19 infection (OR: 2.37, 95%CI: 1.02, 6.15). Among those with a provider visit, fear of COVID-19 infection was associated with two-fold increased odds of having a telemedicine visit vs. an in-person visit (OR: 2.23, 95%CI: 1.09, 4.51), however this was not statistically significant in the adjusted model. There were however significant associations detected in the adjusted model for HIV status, insurance type and telemedicine utilization respectively. DISCUSSION/SIGNIFICANCE: This study demonstrates the ongoing need for health services during the recent pandemic and overall willingness of AYA to utilize telemedicine. Given the sexual health disparities faced by AYA, who bear more than half of the 50 million STI cases in the US, optimizing services for AYA is essential and consistent with new laws expanding telehealth use.

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### Cumulative Cancer Location Incidence and Cancer Progression in an Active Surveillance Cohort

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OBJECTIVES/GOALS: Prostate cancer is the 2nd most common cancer among men. 1/3 of these men have a slow-growing disease that can be managed without intervention. Instead of treatment, they can enter an active surveillance program. The goal of this study is to examine if cumulative cancer location can predict one's disease progression and be used as a clinical marker. METHODS/STUDY POPULATION: This is a retrospective cohort study consisting of men with Gleason Grade 1 prostate cancer enrolled in the Active Surveillance Program at Johns Hopkins. The cohort includes men who were enrolled in the program from 2007 to 2015 before prostate biopsies incorporated multiparametric MRI as of the prostate. We will assess if cumulative cancer location (CCLO), a sum of the total number of histological cancer-positive locations on diagnostic and confirmatory biopsy, can predict grade progression, adverse findings on radical prostatectomy findings, or protocol-based discontinuation. Kaplan Meier survival analyses and multivariable Cox regression will be used to determine if stratifying by CCLO can predict these outcomes. RESULTS/ANTICIPATED RESULTS: We included 1298 men in this study. The study will analyze variables that will be used in multivariable regression. Some variables of interest include age at diagnosis, PSA, PSA density, race/ethnicity, and number of positive cores. We expect that greater variability of tumor location, a higher CCLO score, will lead to more grade progression, protocol-based discontinuation, shorter time on active surveillance and adverse findings after radical prostatectomy. This hypothesis is based on a 2018 study that determined cancer location as a significant predictor of progression at the time of biopsy. Results will be discussed in full at the conference. DISCUSSION/SIGNIFICANCE: Finding a predictive marker of progression at the time of biopsy is clinically significant and can lead to adjusted patient observation and testing while on active surveillance. This will better stratify men on active surveillance, determine who would benefit from genetic testing, and better counsel patients as to how long they will be on surveillance.

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### Environmental Exposure to Metals Mixtures and the Outcome of Cognitive Function in Adolescents

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OBJECTIVES/GOALS: Exposure to arsenic, cadmium, manganese, and lead have been linked to adverse neurocognitive outcomes in adults/children, but effects in adolescents are not fully characterized. This study aims to examine the association between exposure to a mixture of metals (As, Cd, Mn, Pb, Se) and cognitive function in adolescents. METHODS/STUDY POPULATION: The Metals, Arsenic, & Nutrition in Adolescents Study (MANAS) is a cross-sectional study of 572 Bangladeshi adolescents. Blood levels of As, Cd, Mn, Pb, and Se were measured via ICP-MS. An abbreviated Cambridge Neuropsychological Test Automated Battery (CANTAB) was administered, with subtests assessing cognitive function and executive function tasks. Linear regression and Bayesian kernel machine regression (BKMR) were used to examine associations between individual metals, the overall mixture of metals, and cognitive function as measured by the CANTAB. RESULTS/ANTICIPATED RESULTS: Linear regression showed that As (B=-2.40) and Mn (B=-5.31) were negatively associated with Spatial Working Memory (p<0.05). Negative associations were also observed between Cd and Spatial Recognition Memory (SRM) (B=-2.77, p<0.05), and between Pb and Delayed Match to Sample (DMS), a measure of visual recognition and memory (B=-3.67, p<0.05). Se and Spatial Span Length (B=0.92, p<0.05) were seen to be positively associated. BKMR showed no overall effect of the mixture but indicated that Pb was negatively associated with DMS, and that Cd was negatively associated with SRM. Se was positively associated with Planning, Reaction Time, and Spatial Span. Posterior inclusion probability consistently rated Se as the most influential mixture component. DISCUSSION/SIGNIFICANCE: Se was positively associated with cognition, while Mn and As were linked to poorer working memory, and Cd and Pb were associated with poorer visual recognition and memory. We saw agreement between linear regression and BKMR in analyzing metal mixture exposures. Findings suggest interventions aimed at adolescents might influence lifelong cognition.

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### Chronic cadmium exposure is associated with cognition among adults over age 60 in a representative US sample\*

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OBJECTIVES/GOALS: To examine the relationship between chronic cadmium exposure and cognitive function in later life, we estimated the association of urinary cadmium concentration on composite cognitive score, an important marker of progression toward dementia, while accounting for diet and key co-pollutants tobacco use and lead exposure. METHODS/STUDY POPULATION: After excluding those missing cognitive data (141) or covariate data (190), we included 760 persons >= 60 years of age from the National Health and Nutrition Examination Survey (NHANES), 2011-2014. Urinary cadmium reflects prolonged exposure: mean=0.41µg/L (standard deviation

(SD)=0.46 $\frac{1}{4}$ g/L). Concurrent with urine sampling, neuropsychological tests tapping memory, executive function, sustained attention and working memory were combined into a standardized z-score (mean 0, SD 1, 25th and 75th percentiles -0.68 and 0.72, respectively). We used linear models to estimate change in cognition per cadmium interquartile range, incorporating NHANES sampling weights, adjusting for demographic characteristics, diet, lead, and active tobacco use (classified by self-report or serum cotinine levels >10ng/mL). RESULTS/ANTICIPATED RESULTS: A baseline model showed that an IQR (0.38  $\frac{1}{4}$ g/L) increase in urinary cadmium exposure was associated with a 13% standard deviation lower cognitive z-score (95%CI: -0.19, -0.06), after adjusting for sampling weight and urinary creatinine (measure of urine dilution). This association was attenuated to 7% standard deviation lower cognitive z-score (95% CI -0.13, -0.02) after adjusting additionally for demographic characteristic of sex, age, age<sup>2</sup>, race/ethnicity, marital status, education level, and poverty income ratio. Models further adjusted for smoking status (active/former/never), blood lead concentration, and key dietary sources of cadmium showed IQR increase in urinary cadmium exposure associated with 7% standard deviation lower cognitive z-score (95%CI: -0.14, -0.01). DISCUSSION/SIGNIFICANCE: Our findings suggest cadmium exposure is associated with lower cognitive scores even after accounting for confounding influence of diet, tobacco use and lead exposure. Alternate explanations include selection bias due to dropping persons missing needed variables and using concurrent cognitive measures rather than cognitive measures of over time.

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### Flavored tobacco sales restrictions and e-cigarette use among high school students in California

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OBJECTIVES/GOALS: Flavored tobacco sales restrictions (FTSRs) are implemented to reduce access to flavored tobacco products. We examined the association between seven local FTSRs implemented in 2018/2019 and e-cigarette use among high school students in the Bay Area region of California. METHODS/STUDY POPULATION: We analyzed data from the California Healthy Kids Survey using a difference-in-differences (D-I-D) strategy. We compared pre- and post-policy changes one year after implementation in current tobacco use (e-cigarettes and cigarettes) among students exposed (n=20,832) versus unexposed (n=66,126) to a FTSR. Exposed students attended school in a city with a FTSR. Other outcomes included ever use of e-cigarettes, ever marijuana use in an e-cigarette, and ease of access to e-cigarettes. RESULTS/ANTICIPATED RESULTS: Pre- to post-policy, current tobacco use did not change in exposed students (e-cigarette: 10.5% to 11.1%; cigarette 2.6% to 2.5%) and decreased in unexposed students (e-cigarette: 12.8% to 11.4%; cigarette: 2.2% to 1.7%). FTSRs were not associated with a change in odds of current e-cigarette (adjusted D-I-D OR: 1.25, 95% CI: 0.95, 1.65) or cigarette use (adjusted D-I-D OR: 1.24, 95% CI: 0.94, 1.63), relative to unexposed students. For both exposed and unexposed groups, there was a 54-57% increased odds of reporting ease of access to e-cigarettes and a 29-35% increased odds of ever using marijuana in an e-cigarette. No change was detected for ever e-cigarette use. DISCUSSION/SIGNIFICANCE: Local FTSRs in California were not associated with a decrease in e-cigarette or cigarette use one-year post-implementation. Increased ease of access and marijuana use may be explanatory factors.

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### Clinical Presentations of Adult and Pediatric SARS-CoV-2-Positive Cases in a Community Cohort

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OBJECTIVES/GOALS: The spectrum of disease caused by SARS-CoV-2 ranges from asymptomatic detection to severe illness, with varying presentations by age. Therefore, we aimed to compare the clinical characteristics between children and adults with SARS-CoV-2. METHODS/STUDY POPULATION: From March 20, 2020, to August 18, 2021, we conducted SARS-CoV-2 surveillance in individuals from metropolitan Nashville, TN. Children with multi-system inflammatory syndrome were excluded. Analyses were restricted to individuals with SARS-CoV-2 infection confirmed by detection of viral RNA in nasal specimens using reverse-transcription quantitative polymerase chain reaction (RT-qPCR) and/or by detection of serum IgG to the SARS-CoV-2 spike and nucleocapsid proteins using enzyme-linked immunosorbent assay (ELISA). Those with negative RT-qPCR results, but a positive ELISA within 4-6 weeks of symptom onset, were classified as SARS-CoV-2 positive. Clinical characteristics between children and adults were compared with Pearson's chi square. Illness duration was compared using Kaplan Meier estimators. RESULTS/ANTICIPATED RESULTS: Overall, 426/826 (49%) individuals (children: 57 [13%]; adults: 369 [87%]) were SARS-CoV-2 positive, with median ages of 12 and 41 years, respectively. Most individuals were female (54%) and white, non-Hispanic (79%). Compared to adults, children were more likely to be asymptomatic (children: 16% vs. adults: 5%; p=0.001). In contrast, symptomatic adults were more likely to report cough (71% vs. 56%), wheezing (21% vs. 8%), shortness of breath (45% vs. 19%), ageusia (67% vs. 23%), and anosmia (64% vs 27%) than symptomatic children (p<0.05). Mean illness duration was shorter in children than adults: 7 days (95% CI: 5.1, 8.9) vs. 14 days (95% CI: 12.4,15.0), respectively. A total of 5% (18/352) of adults reported symptoms lasting > 4 weeks (range: 31-96 days), whereas all symptoms in children resolved by 31 days. DISCUSSION/SIGNIFICANCE: Overall, children with SARS-CoV-2 present with a shorter and milder disease course compared to adults. Further studies are needed to understand SARS-CoV-2 illness severity across the lifespan.

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### Characterizing Physician Suicide in the U.S. (2003-2017)

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OBJECTIVES/GOALS: Suicide is a growing public health problem with the rate of suicide increasing 33% since 1999. Physicians are not immune to this growing problem. Physicians represent a unique population that has been understudied with respect to suicide. The aim of the study is to investigate risk factors unique to physicians compared to the general population. METHODS/STUDY POPULATION: Using data from the National Violent Death Reporting System, a nationwide CDC database which aggregates