Title: Assessing the impact of COVID-19 on substance use in California: An analysis of 2019-2020 California Health Interview Survey data

Authors: Marise Thadani, Pooja Mhatre, Ou Suk (Andrew) Kwon, and Matthew Willis

Background: Data indicates that substance use can lead to negative health consequences such as cancer and heart disease. Importantly, recent literature suggests that COVID-19 has negatively impacted factors that affect substance use, such as depression, anxiety, and mental well-being; indeed, one study found that rates of smoking and drinking increased in China during the pandemic. With over 39 million people of various ethnic/racial groups, an analysis of changes to substance use in California may offer insight into COVID-19's impact across diverse populations.

Methods: The California Health Interview Survey (CHIS) is a statewide survey for assessing the health behaviors of Californians. Utilizing the survey's built-in final and replicate weights to achieve representativeness of the state population, we compared the frequency of self-reported substance use between the 2019 and 2020 adult data sets. Substance categories included tobacco use (both cigarettes/cigars and e-cigarettes); hookah; marijuana/hashish, and illicit drugs. Using a significance level of 0.05, chi-square tests were used to determine differences in self-reported substance use by year and logistic regression models were used to control for the demographic characteristics of sex, income, and education. Odds ratios were generated to quantify the relationships amongst these variables. All analyses were conducted in R version 4.1.1.

Results: Although several substance use variables significantly differed by year, only exposure to secondhand tobacco smoke/e-cigarette vapor in the past two weeks varied considerably between the two years (44% and 27% in 2019 and 2020, respectively). The remaining significant variables differed by at most 1.8% between years. Logistic regression models indicated that exposure to secondhand tobacco smoke/e-cigarette vapor significantly decreased in 2020 compared to 2019 (OR 0.46, $p=<0.001$); was lower in females than males (OR 0.87, $p=<0.001$); was higher in adults with some college education (OR 1.18, $p=0.001$) but lower in adults with a graduate degree (OR 0.79, $p=<0.001$) as compared to adults with no formal education/a high school diploma; and was lower in adults with household incomes greater than \$170,000 as compared to those earning less than \$20,000 (OR 0.81, $p=0.001$).

Conclusion: Although self-reported substance use did not meaningfully change in California for most variables since COVID-19, secondhand smoke/e-cigarette vapor exposure significantly decreased between 2019 and 2020, suggesting a positive outcome of statewide quarantine and social distancing measures. However, new restrictions on smoking in public spaces may also be contributing to this decrease. Further research is needed to assess the direct impact of COVID-19 on secondhand smoke/e-cigarette vapor exposure.