MICHIGAN BRFSS SURVEILLANCE BRIEF

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Secondhand Smoke Exposure Within the Home and Health Outcomes among Michigan Adults, 2019

In 2019, one in every nine Michigan adults reported that someone smoked cigarettes, cigars, or pipes in their home in the past seven days. Using data from the 2019 Michigan Behavioral Risk Factor Survey (MiBRFS), this surveillance brief examines the prevalence of secondhand smoke (SHS) exposure within the home by demographic characteristics among Michigan adults. Additionally, this brief compares the prevalence of social determinants of health and health outcomes among Michigan adults who were exposed to SHS compared to those without SHS exposure within the home.

Background

SHS is the combination of smoke from the burning end of a cigarette and the smoke breathed out by smokers. SHS contains more than 7,000 chemicals.[1,2,3,4] People are exposed to SHS at home, in the workplace, and in other public places such as bars, restaurants, and recreation venues. Exposure to SHS has immediate adverse respiratory and cardiovascular effects. The negative health consequences are well documented. In addition to causing lung cancer, heart disease, and stroke, SHS exposure has been associated with increased risk for respiratory disease like chronic obstructive pulmonary disease (COBD), poor mental health, depressive disorders, and arthritis.

The decline in secondhand smoke exposure among people who do not smoke is likely due to:[5] decreasing cigarette smoking rates, increased awareness of the risks for SHS exposure, and the adoption of comprehensive smoke-free laws prohibiting smoking in workplaces and public places as the progress that had been made in Michigan since 2010 when the state adopted comprehensive smoke free law, but disparities in exposure rates in homes persists. Those of lower socioeconomic status and lower educational attainment remain more likely to be exposed to SHS.

Methods

The Michigan Behavioral Risk Factor Surveillance System (BRFSS) is a telephone-based health survey of adult Michigan residents that provides statewide prevalence of chronic health conditions, health-related behaviors, medical conditions, and preventive health care practices. The Michigan BRFSS provides cross-sectional data, and a temporal relationship cannot be established. To improve the generalizability of the data, making it possible to draw conclusions about the health of Michiganders, CDC weighted survey data using iterative proportional fitting, also known as raking, to account for demographic differences between the survey sample and Michigan's population.

One state-added question on SHS exposure within the home was included in the 2019 MiBRFS. The question was, "In the past seven days, did anyone smoke cigarettes, cigars, or pipes anywhere inside your home?". For this analysis, "SHS exposure" was defined as those responding positively to the question.

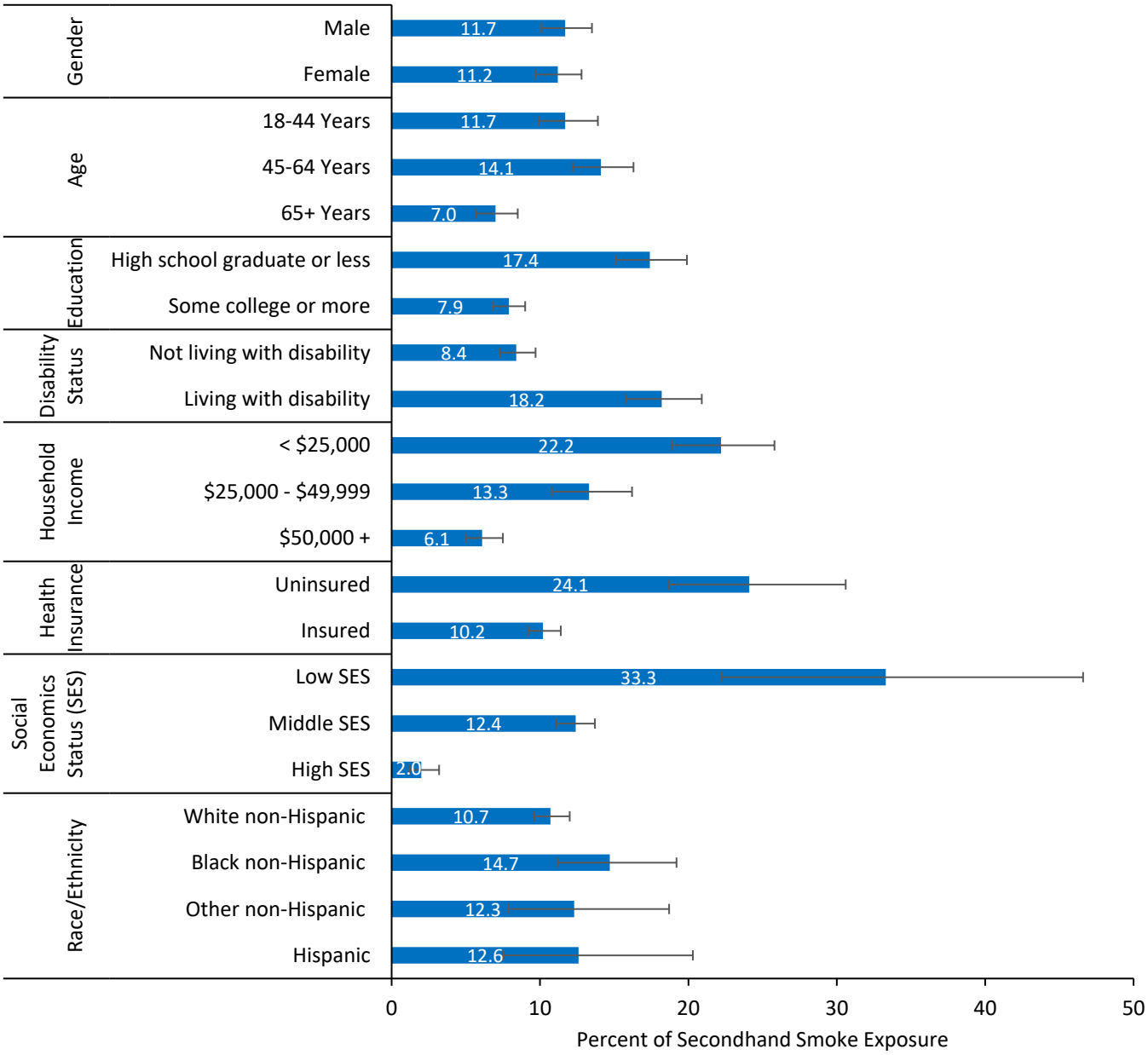
The prevalence of SHS exposure status among Michigan adults was assessed by age, gender, race/ethnicity, education, household income, health insurance status, disability status, and social economics status (SES). In addition, the prevalence of social determinants of health and health outcomes among Michigan adults who were exposed to SHS compared to those without SHS exposure in the home within the past seven days.

Results

Prevalence of SHS Exposure Status

Based on 2019 MiBRFS data, an estimated one in nine (11.4%) Michigan adults reported being exposed to SHS within the home. The prevalence of SHS exposure status in the home was similar across gender and race/ethnicity (Figure 1). Young adults were more likely to report being exposed to SHS (11.7% for adults aged 18-44 years old and 14.1% for adults aged 45-64 years old) than adults aged 65 years and older (7.0%). The prevalence of SHS exposure was significantly higher among adults with high school graduate or less education (17.4%) than those with some college or more education (7.9%). Adults reporting disability were more likely to be exposed to SHS than those not reporting disability (18.2% vs. 8.4%, respectively). The prevalence of SHS exposure decreased with increasing household income (22.2% for household income less than $25,000, 13.3% for $25,000-49,999, and 6.1% for $50,000 or above). Uninsured adults (24.1%) reported SHS exposure more frequently than insured adults (10.2%). Compared to adults with high SES (2.0%), Adults with low SES and middle SES reported significantly higher rate of SHS exposure within the home (33.3% and 12.4%, respectively).

Figure 1. Prevalence of Secondhand Smoke Exposure by Demographics among Michigan Adults, 2019 Michigan BRFS

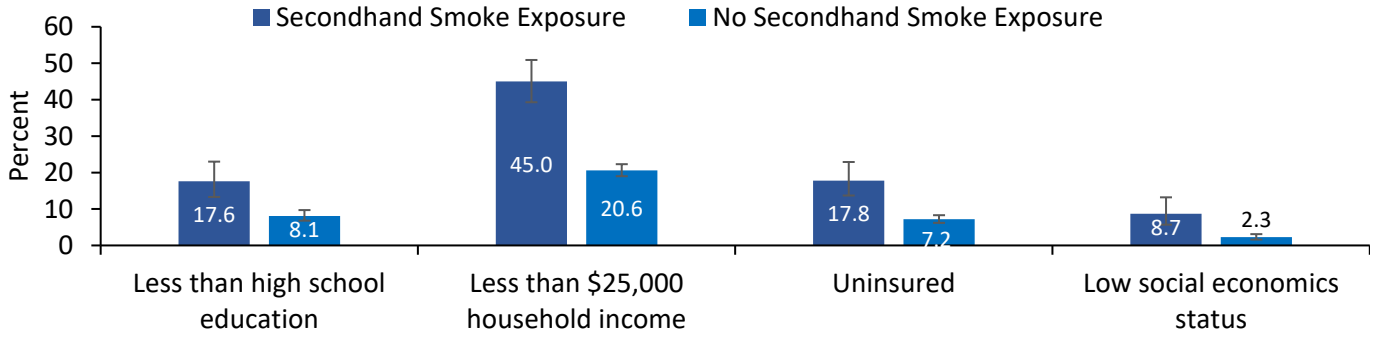


Error bars represent 95% confidence intervals. Data Source: Michigan Behavioral Risk Factor Surveillance System, 2019

SHS Exposure Status and Social Determinants of Health

Figure 2 displays the prevalence of social determinants of health among Michigan adults with SHS exposure compared to adults without SHS exposure in the home. Overall, these results indicate significant differences by SHS exposure status for education, household income, health insurance status, and SES. The prevalence of less than high school education was significantly higher among adults with SHS exposure (17.6%) compared with those without SHS exposure (8.1%). Adults with SHS exposure had a significantly higher prevalence of household income less than $25,000 than adults without SHS exposure (45.0% vs. 20.6%). The prevalence of uninsured was significantly higher among adults with SHS exposure (17.8%) than among adults without SHS exposure (7.2%). Compared to adults without SHS exposure (2.3%), adults with SHS exposure were more likely to report low SES (8.7%).

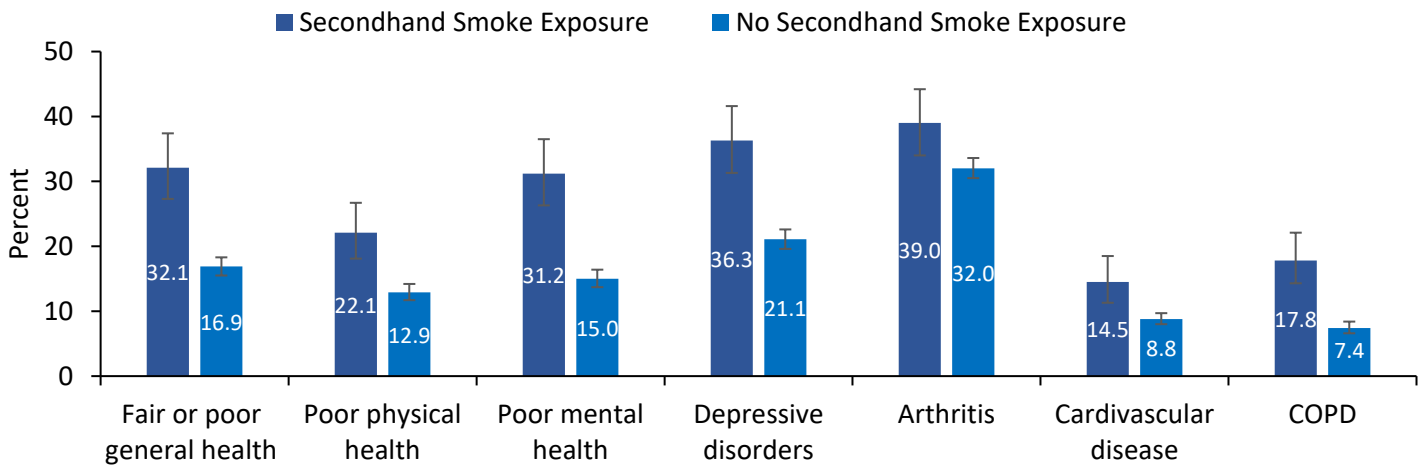
Figure 2. Prevalence of Social Determinants of Health by Secondhand Smoke Exposure Status among Michigan Adults, 2019 Michigan BRFS



SHS Exposure Status and Health Outcomes

Figure 3 shows the prevalence of health outcomes among Michigan adults with SHS exposure compared to adults without SHS exposure in the home. Overall, these results indicate significant differences by SHS exposure status for general health, physical health, mental health, depressive disorders, arthritis, cardiovascular disease, and chronic obstructive pulmonary disease (COPD). The prevalence of fair or poor general health, poor physical health and poor mental health was significantly higher among adults with SHS exposure (32.1%, 22.1%, and 31.2%, respectively) compared with those without SHS exposure (16.9%, 12.9%, and 15.0%, respectively). Compared to adults without SHS exposure (21.1%, 32.0%, 8.8%, and 7.4%, respectively), adults with SHS exposure were more likely to report depressive disorder, arthritis, cardiovascular disease, and COPD (36.3%, 39.0%, 14.5%, and 17.8%, respectively).

Figure 3. Prevalence of Health Outcomes by Secondhand Smoke Exposure Status among Michigan Adults, 2019 Michigan BRFS



Discussion

Breathing SHS can have immediate adverse effects on blood vessels, increasing the risk of having a heart attack.[2,3,4] Also Long-term exposure to SHS during childhood increases the risk of COPD death in adulthood, according to a new study.[6] Another study found that exposure to SHS was associated with an increase in depressive symptoms and suicidal ideation among adults. These results are like the findings from previous research that SHS may increase the risk of depressive symptoms.[7] Exposure to SHS in childhood can lead to greater risk of rheumatoid arthritis later in life, even in non-smoking adults according to new research.[8] We found similar results in Michigan with a statistically significant increase in cardiovascular disease and COPD, poor mental health, depressive disorders, arthritis among Michigan adults with SHS exposure compared to adults without SHS exposure in the home.

SHS exposure is higher among people with low incomes,[9] which also a significant finding in Michigan in addition to people living with disability or adults uninsured. A study from the 2019 National Youth Tobacco Survey observed that the prevalence of self-reported exposure to SHS in homes among United States middle and high school students was significantly different by race/ethnicity, with the highest among Black non-Hispanic (28.4%) and lowest among Hispanic (20.0%).[10] In our study, SHS prevalence was highest among Black non-Hispanic adults (14.7%), but this result was not statistically significant. One limitation is that the Michigan BRFSS provides cross-sectional data, and a temporal relationship cannot be established. We can only examine the association between SHS exposure and health outcomes and cannot assess the causation relationship from the Michigan BRFSS data.

Conclusion

Despite the successful implementation of the comprehensive smoke free law in Michigan, disparities in SHS exposure rates in homes persist among Michigan adults.

Recommendations

Policies prohibiting smoking in housing, coupled with cessation information and easy access to quitting services, could encourage people who smoke to quit, and thereby reduce SHS exposure. Also, clinicians should routinely ask about SHS exposure, particularly in susceptible groups or when a child has had an illness caused by SHS, such as pneumonia.

References

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What is the Michigan Behavioral Risk Factor Surveillance System (MiBRFSS)?

The MiBRFSS comprises annual, statewide telephone surveys of Michigan adults aged 18 years and older and is part of the national BRFSS coordinated by the CDC. The MiBRFSS follow the CDC BRFSS protocol and use the standardized English core questionnaire that focuses on various health behaviors, medical conditions, and preventive health care practices related to the leading causes of mortality, morbidity, and disability. Landline and cell phone interviews are conducted across each calendar year. Data are weighted to adjust for the probabilities of selection and a raking weighting factor is used to adjust for the distribution of the Michigan adult population based on eight demographic variables. All analyses are performed using SAS-callable SUDAAN® to account for the complex sampling design.

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