Wildfire Smoke Health Study: Historical Exposures Affect Long-Term Health

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Globally, anthropogenic climate change is causing an increase in wildfires, resulting in increased exposure to wildfire smoke. Current literature indicates exposure to a single wildfire smoke event is associated with a sustained decrease in lung function. However, the cumulative effects of repeated exposures to wildfire smoke, such as those experienced in communities like Missoula, MT, are little studied and remain unknown. Missoula County has experienced significantly higher wildfire smoke exposure than the rest of Western Montana from 1999 to 2022 ($p<0.01$). For this pilot study, a cohort of Missoula residents, ages 18 to 30 years old, with no history of smoking or vaping, was recruited ($n=20$). Participants completed a survey detailing their residential, medical, occupational, and activity-level history. Participants were administered spirometry and blood pressure exams. Each participant's lifetime wildfire smoke PM2.5 Burden was determined based on EPA-sourced historical PM2.5 data to the nearest zip code of their residence. Increased lifetime PM2.5 Burden was found to be significantly correlated with decreased lung function, in terms of percent predicted FEV1/FVC ratio ($p<0.05$). Participants exhibited a range of lifetime exposures, illustrating the appropriateness and feasibility of using Missoula as a community to assess the long-term health effects of repeated wildfire smoke exposures.

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