# Wildfire smoke exposure and ischemic stroke hospitalizations in California: A time-stratified, case-crossover study

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**Abstract**

As the global climate changes, wildfire events are anticipated to occur with greater frequency and intensity. Although exposure to fine particulate matter less than 2.5 microns in diameter (PM2.5)–a major health harmful component of wildfire smoke–has been previously associated with ischemic stroke, no prior studies have specifically examined the implications of wildfire smoke exposure for ischemic stroke risk. We propose to address this key gap in the extant literature by leveraging detailed, high-quality patient-level data from the national Get With The Guidelines (GWTG)-Stroke Registry linked with previously derived, novel measures of daily average wildfire and non-wildfire PM2.5 for the state of California at the zip-code level. Using a time-stratified case-crossover approach, we will examine the association of wildfire-and non-wildfire PM2.5 with acute ischemic stroke outcomes. Because prior literature consistently demonstrates a disproportionate burden of adverse health effects associated with environmental exposures among racialized and economically marginalized individuals and communities, we further propose a detailed examination of potential heterogeneity by individual- and area-level social determinants. We hypothesize that exposure to both wildfire and non-wildfire PM2.5 will be associated with increased odds, with stronger magnitude-of-association observed for wildfire PM2.5. We further hypothesize that association with wildfire PM2.5 will be greatest in minoritized and low-income patients and those living in areas defined by high poverty, greater household crowding, greater percent population of color, and greater inequality. By characterizing stroke risk associated with wildfire smoke exposure, the goal of the proposed research is to help physicians to more effectively counsel and risk-stratify their patients and to inform effective resource allocation at the hospital and health-system level. We further aim to identify individual risk factors and structural inequalities, and potentially yield actionable targets for intervention to reduce the impact of climate change on the most vulnerable populations and communities.