

WILDFIRE SMOKE, RESIDENTIAL FIRE PROXIMITY, AND HEALTHCARE USE IN OLDER ADULTS WHO USE DURABLE MEDICAL EQUIPMENT

Heather McBrien, Sebastian T. Rowland, Tarik Benmarhnia, Sara Y. Tartof, Benjamin Steiger, Joan A. Casey

BACKGROUND

- Wildfire-generated PM_{2.5} is associated with worsening of cardiorespiratory disease
- People who use electricity-dependent medical equipment may be at high risk from smoke PM_{2.5} exposure
- Stress from wildfire evacuation or threatened evacuation may also worsen disease
- Though wildfire exposure is multifaceted, few studies focus on exposures other than smoke

DATA

- EHR data from 236,732 Kaiser Permanente Southern California members 45+ who rented a medical device, 2016-2020
- Counts of outpatient, inpatient, and ED visits, and inpatient and ED visits made for cardiopulmonary concerns by ZIP code
- Wildfire PM_{2.5} and non-wildfire PM_{2.5} concentrations from models based on ground sensors and satellite images
- CALFIRE wildfire boundary data for the Getty and Woolsey fires; identified all ZIP codes within 20km of each fire
- Digitized the evacuation zones from both fires and found all ZIP codes within 10km of either evacuation zone



ANALYSIS

- Assessed the relationship between wildfire PM_{2.5} and healthcare use, as well as proximity to wildfire and healthcare use
- Linked healthcare visit counts to wildfire PM_{2.5} measurements and used negative binomial models to assess the association between lags 0-7 wildfire PM_{2.5} concentrations and frequency of outpatient, inpatient, and ED visits
- We controlled for non-wildfire PM_{2.5} temperature, long-term seasonal trends, and SES-related variables
- We used a difference-in-differences approach to assess the association between fire proximity and healthcare use
- We used negative binomial models to find the change in visit frequency attributable to proximity or evacuation from either fire



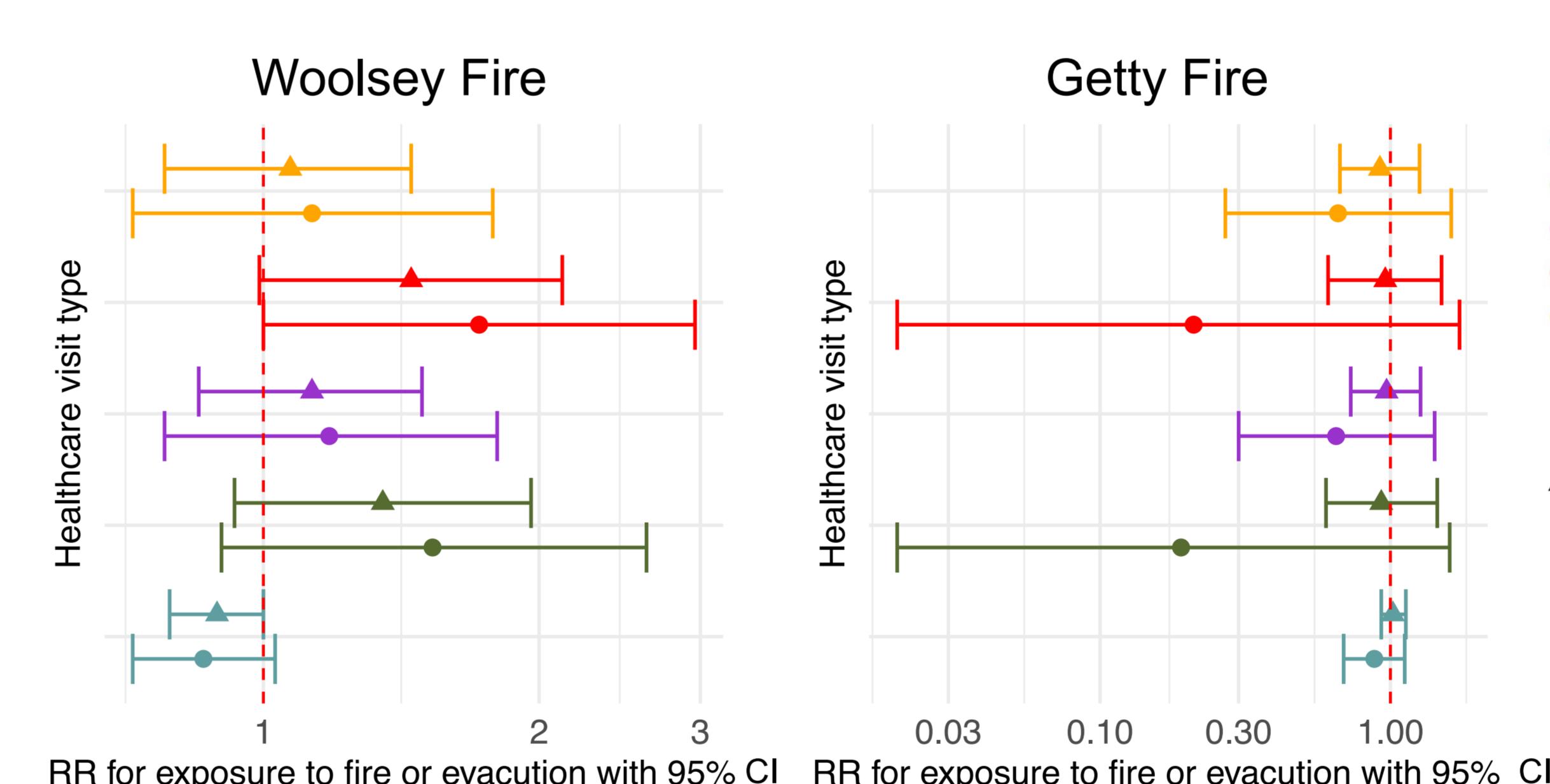
Columbia University
MAILMAN SCHOOL
OF PUBLIC HEALTH

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MAIN FINDINGS

- Wildfire smoke exposure (PM_{2.5}) increased outpatient visits in older adults who use electricity-dependent medical devices.
- During the notable 2019 Woolsey Fire, older adults who use electricity-dependent medical devices were hospitalized more frequently during the fire for cardiopulmonary problems.

PROXIMITY AND EVACUATION RESULTS



WILDFIRE PM_{2.5} RESULTS

Increased wildfire PM_{2.5} concentration (per 10 $\mu\text{g}/\text{m}^3$) was associated with reduced risk (RR = 0.96, 95% CI: 0.94, 0.99) of all-cause outpatient visits one day after exposure and increases on 4/5 subsequent days (RR range 1.03-1.12)

