

Associations Between Wildfire Events and Health

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HAQAST6 MEETING

High PM_{2.5} Level due to Wildfire in Bay Area

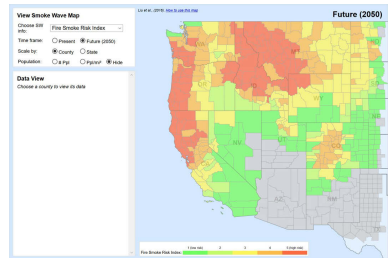
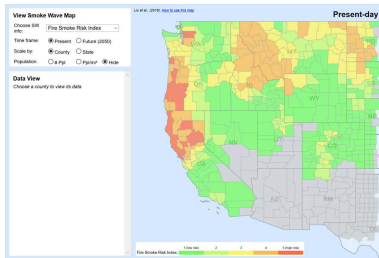


Clear Day



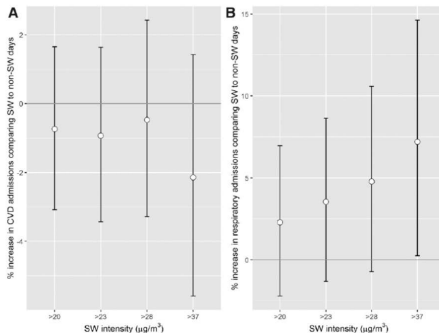
During wildfire

Wildfire Risk Index



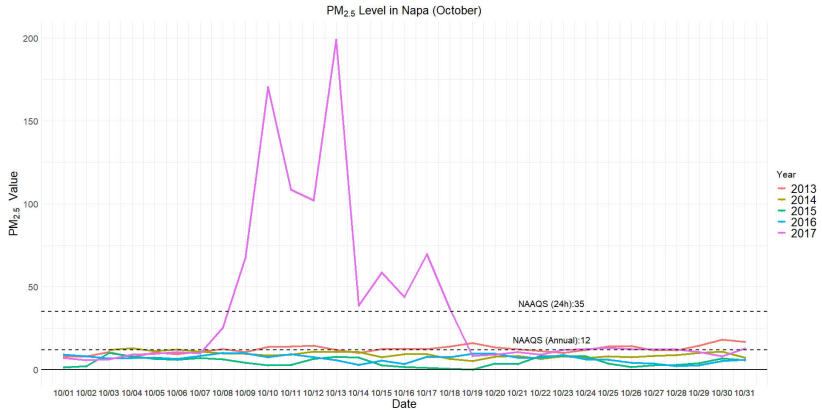
- For 2004-2009, on days exceeding $PM_{2.5}$ standards, wildfires contributed an average of 71.3 % of total $PM_{2.5}$
- Affected area by wildfire is expanding. West Coast and the Great Plains are likely to suffer the highest exposure to wildfire smoke in the future
- More than 82 million people will expose to wildfire smoke

Health Effect Estimates by Wildfire during 2004–2009



- A 7.2% (95% CI: 0.25–15) increase in risk of respiratory hospitalizations during smoke wave days (≥ 2 consecutive days with daily wildfire-specific $\text{PM}_{2.5} > 37 \mu\text{g}/\text{m}^3$)

PM_{2.5} Trends at Napa in October by year (2013 – 2017)



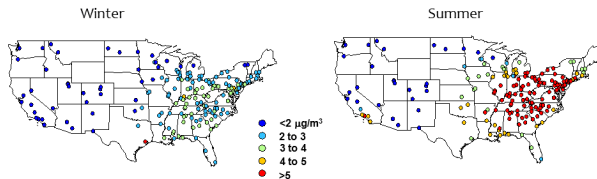
- Highest PM_{2.5} value was over 150 µg/m³

Data We Are Interested in

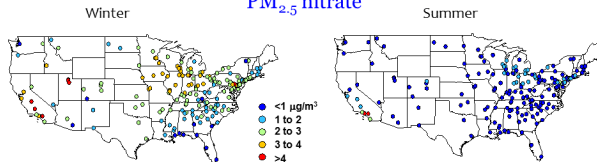
In addition to PM_{2.5} total mass during wildfire,

- PM_{2.5} chemical constituents
- PM₁₀ and PM_{10-2.5} total mass
- Exposure levels during non-wildfire period

PM_{2.5} sulfate



PM_{2.5} nitrate



Bell et al. (EHP, 2007)



- [1] M. L. Bell, F. Dominici, K. Ebisu, S. L. Zeger, and J. M. Samet.
Spatial and temporal variation in pm2. 5 chemical composition in the united states for health effects studies.
Environmental health perspectives, 115(7):989–995, 2007.
- [2] J. C. Liu, L. J. Mickley, M. P. Sulprizio, F. Dominici, X. Yue, K. Ebisu, G. B. Anderson, R. F. Khan, M. A. Bravo, and M. L. Bell.
Particulate air pollution from wildfires in the western us under climate change.
Climatic change, 138(3-4):655–666, 2016.
- [3] J. C. Liu, A. Wilson, L. J. Mickley, F. Dominici, K. Ebisu, Y. Wang, M. P. Sulprizio, R. D. Peng, X. Yue, J.-Y. Son, et al.
Wildfire-specific fine particulate matter and risk of hospital admissions in urban and rural counties.
Epidemiology (Cambridge, Mass.), 28(1):77–85, 2017.