

Background: Characterizing factors which determine susceptibility to air pollution is an important step in understanding the distribution of risk in a population and is a critical for setting appropriate air quality management policies.

Objective: To evaluate general and specific measures of community health as modifiers of risk for asthma and congestive heart failure (CHF) following an episode of acute exposure to wildfire smoke.

Methods: A population-based study of emergency department visits and daily concentrations of fine particulate matter (PM_{2.5}) during a wildfire in North Carolina was performed. Estimated concentrations of PM_{2.5} dispersed from the wildfire were obtained from a mathematically modeled smoke forecasting system. Estimates of relative risk (RR) were obtained from a Poisson mixed effects regression model applied to daily counts. In this manuscript we assessed whether the relative risk associated with wildfire exposure was modified by determinants of community health defined by County Health Rankings. These rankings measure factors that influence overall health within a county: health behaviors, access and quality of clinical care, social and economic factors, and physical environment, as well as, the outcomes of health: premature mortality and morbidity.

Results: For asthma, the strongest association was observed at lag day 0 with excess RR of 66% (28,117). For CHF, excess RR was 42% (5,93). The largest difference in RR was observed after stratifying on the basis of Socio-Economic Factors (SEF). Difference in RR between bottom and top ranked counties by SEF was 85% and 124% for asthma and CHF respectively.

Conclusions: The results indicate that SEF should be considered as independent risk factors in air pollution studies and be evaluated in the assessment of air pollution impacts.

DISCLAIMER

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