

2016 Webb-Waring Biomedical Research Awards Investigator Research Profile



James L. Crooks, Ph.D.



National Jewish Health

Dr. Crooks is currently an assistant professor at National Jewish Health. He previously completed postdoctoral training in environmental statistics, environmental epidemiology and exposure science at the U.S. Environmental Protection Agency in Research Triangle Park, N.C., and in statistics at Duke University. Dr. Crooks earned his Ph.D. in physics and his M.S. in statistics at University of North Carolina Chapel Hill.

Select Honors

A paper authored by Dr. Crooks was selected as the first runner-up for best paper in the 2014 Environmental Policy category by the editors of the journal *Environmental Science & Technology*. He has also received the Office of Research and Development Impact Award as part of the NOx Budget Trading Program Accountability Team.

Medical Focus

Wildfires in the United States have increased in intensity over the past 30 years, and are expected to increase further as the Earth's climate warms through the 21st century and beyond. Smoke from wildfires can travel hundreds of kilometers downwind and can linger for many days, and emit particulates, ozone, carbon monoxide and other air pollutants that adversely impact human health. These impacts are known to include increased all-cause mortality and low birth weight, as well as emergency department and hospital admissions or cardiovascular and respiratory outcomes. A survey of one fire-impacted Australian community exposed to forest fire smoke found 70% of respondents reported health effects due to the fire and 5% sought medical treatment. Looking specifically at asthma, wildfire smoke has been linked to increases in severe asthma-related outcomes such as emergency department visits and overall hospital attendances. However, there has been only limited work investigating wildfire health impacts in children or relating wildfire smoke exposures to moderate-severity health outcomes such as unscheduled outpatient clinic visits and standard clinical measures. Pediatric asthma patients in particular constitute a population that is both relatively large and known to be vulnerable to environmental perturbation.

Research Proposal

Dr. Crooks' research proposal is designed to investigate and quantify the impact of wildfire smoke on the health of pediatric asthma patients using both population-level hospitalization data from the Colorado Department of Public Health and Environment and clinical data from the National Jewish Health patient population. His hypothesis is that wildfire smoke exposure is associated with an increased risk of hospitalizations and unscheduled outpatient clinic visits, higher scores on the Asthma Control Test and decreased lung function as measured by FEV1. Using the results of his research he will identify a set of wildfire-responding asthma patients who have biological samples stored in the National Jewish Health Biobank and who can, in the future, provide pilot data for molecular characterization studies seeking to uncover the epigenetic and immunological mechanisms mediating the effect of smoke exposure on adverse asthma outcomes.

Dr. Crooks' work will have important implications for public health messaging as well as for climate change mitigation and fire control policies in Colorado and nationally. It will also lay a foundation for follow-up studies seeking to identify molecular mechanisms mediating the exposure response in asthmatic children that could be targeted by novel therapeutic interventions.