JFSP Final Report Summary

Project #: 13-1-02-14

Title: Wildland fire smoke health effects on wildland firefighters and the public

Principal Investigator:

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Objectives:

- Synthesize existing literature on wildland fire smoke components that present the highest health hazard, including the mechanisms of toxicity and epidemiological studies for health effects.

- Using existing data sources, examine smoke exposure versus occupational limits for wildland firefighters. Explore predictors of smoke exposure and sources of variability.

- Estimate disease risk in wildland firefighters for exposure to particulate matter using firefighter specific breathing rates with existing exposure response relationship information for risk of lung cancer, ischemic heart disease, and cardiovascular disease.

Proposed deliverables:
Refereed publications
Conference presentation
Master's Thesis

Status of data collection and analysis
Complete

Status of deliverables/findings
Complete

Status of metadata/datasets
N/A – approved data management plan stipulated that they would not be collecting any new data

Notes/interesting findings

- There is strong evidence that acute episodic wildland fire smoke is associated with respiratory effects among the general population. Current evidence of an association with cardiovascular effects is weak.

- Among firefighters at 83 prescribed fires and 417 wildfires, the 8-hour exposure to carbon monoxide exceeded OSHA standards 3.5% of the time for prescribed fires and 5.6% of the time for wildfires.

- Mop up was a statistically significant cause of exposure during fire operations. Reducing the amount of time firefighters perform mop up operations will be crucial to reducing their exposure to carbon monoxide, respirable particulate matter, and quartz.

- Exposure response relationships indicate that inhaled particulate matter can increase the risk of premature mortality from heart disease or cancer.

Future work:

- The available research on wildland firefighter occupational exposure is currently very limited and there is not enough information to make conclusions with regard to cardiovascular and chronic respiratory effects. Consequently, there is a need to conduct studies of clinically significant health end-points among this population.

- Studies on public health effects of smoke have largely been most relevant to people who are susceptible due to pre-existing diseases. Little is known about the effects of wildland fire smoke exposure over the long term.

- The NWCG Training, Operations & Training and Risk Management Committees should work together to assure smoke exposure hazards are included in NWCG courses beginning with basic wildland fire curriculum through advanced courses.

Final recommendation
Project is complete.