

The Human Health Benefits of Improving Forest Health in California

Investigating the Links Between Forest Management, Wildfire Smoke, and the Health Sector



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Peer-Reviewed Report | Released: Sept. 2023 | CCST & Blue Forest



In California's smoky future, improved forest health means improved human health.

Public health impacts of wildfire smoke are a severely under-represented and under-quantified impact of recent catastrophic wildfires, with economic impacts of wildfire smoke to public and private health systems estimated to cost billions of dollars and disproportionately impacting disadvantaged communities. This study from CCST and Blue Forest shows that improving the health of California's forests can reduce the risk of wildfire and benefit people's health.

Key Report Takeaways

- Wildfire smoke impacts human health and health sector organizations' workforces, operations, and ability to provide services, yet the costs are largely unquantified.** Quantifying these costs would enable state and local health sector organizations to make more informed decisions regarding budgeting, resource allocation, and response (see Chapter 2).
- Many interviewed health sector organizations see value in future engagement with forest management to mitigate adverse outcomes and costs**

associated with wildfire smoke, but require avenues for collaboration and more information on the potential benefits of forest management to human health and the health sector (see Chapter 3).

- Comprehensive statewide or locally specific information on the adverse human health impacts of wildfire smoke are not readily available but could be generated from additional analysis of existing data resources.** The data and methodologies to support the above understanding require thoughtful, forward-looking, collaborative, coordinated research design that is informed by use cases appropriate for California (see Chapter 4).
- A small but growing body of research suggests that management to improve forest health can be tailored to reduce total smoke impacts and benefit human health.** Informed prioritization of management strategies that promote forest resilience and human health across California's many landscapes will benefit from filling data gaps relating the costs and efficacy of various treatments under different conditions (see Chapter 5).

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Report Methods

Part I (Ch. 2 & 3)

Qualitative interviews with 60 individuals in California at public health, health system, and health insurance organizations.

Part II (Ch. 4 & 5)

Review of peer-reviewed academic literature, technical reports, and publicly available data resources on smoke tradeoffs of forest management.

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Made possible with funding by the Innovative Finance for National Forests grant program, with additional funds from the J.M. Kaplan Fund, the Alumbra Innovations Foundation, and the State of California.

Report Recommendations, by Chapter

Based upon the substantive **Findings**, the report presents **Conclusions** and these listed **Recommendations (FCRs)**. The FCRs are designed for the near, middle, and long terms while state and federal land and air management agencies continue to develop policy in collaboration with their health, forest, and air quality management partners.

Find the full list of FCRs in the **Full Report**, as well as quotes from interviews with health sector organizations, figures and tables, definitions, and additional resources.

Chapter 2

Perspectives on Wildfire Smoke Impacts to Human Health and the Health Sector in California

FCR #11. California health, emergency response, environmental, and research-focused agencies and foundations should work with the health sector to fund and develop guidance for public health entities and health systems faced with coinciding environmental and health emergencies.

FCR #18. To help California health sector organizations proactively prepare for and respond to wildfires and wildfire smoke events, public health and air regulatory agencies should collaborate on developing evidence-based best practices for public communication, facility management, and health care delivery during these events.

FCR #21. California health, emergency response, and research-focused agencies and foundations should work with the health sector to develop procedures to quantify and track the impacts and associated costs of wildfire smoke on their organizations' workforce, operations, and ability to provide services.

FCR #22. Health insurance groups should share sufficiently de-identified datasets on claims and healthcare expenditures to complement healthcare utilization data from health systems to better support tracking the costs of wildfire smoke events.

Chapter 3

Perspectives on the Connections Between Forest Health and Human Health

FCR #33. California and federal agencies responsible for forest management, environmental regulation, and health research should continue to fund and support multidisciplinary research that demonstrates how forest management could change wildfire smoke risk and its subsequent impacts on human health and the health sector, at actionable levels of spatial resolution.

FCR #34. California and the federal government should further prioritize health sector interested parties' participation in forest management advisory bodies (e.g., California Wildfire & Forest Resilience Task Force, Forest Service Wildfire Crisis Strategy) to strengthen the linkages between public health and forest management planning and practice.

Chapter 4

Data Resources for Estimating the Health Impacts of Smoke



California and the federal government should...

FCR #37. ... consider creating regularly updated data products that retrospectively track air pollution concentrations attributable to wildland fire smoke, population exposure to smoke, and cases of adverse health outcomes attributable to smoke.

FCR #40. ... expand available smoke data products to include estimates of smoke impacts by individual wildland fires. Tracking smoke impacts back to source fires is foundational data for research on the potential human health benefits of alternative forest management strategies.

FCR #43. ... support efforts to create methodological guidelines for estimating smoke air pollutant concentrations and counts of adverse health impacts attributable to wildland fire smoke in order to facilitate future research efforts.

FCR #46. ... support the development of methodologies to estimate smoke emissions from human-made materials and should expand smoke emissions inventories to additionally include emissions estimates from developed landscapes that are burned by wildland fires.

Research funders should...

FCR #49. ... support studies to develop concentration-response functions that can be used to estimate the effect of differences in how fires burn, what fires burn, and population vulnerability on resulting health impacts from smoke exposure.

FCR #52. ... support studies to better understand the chronic, cumulative, and mental health impacts of smoke exposure and to develop concentration-response functions that can be used to estimate cases of such adverse health outcomes in populations exposed to smoke.

Chapter 5

Evidence that Forest Management can Benefit Human Health

FCR #55. California, the federal government, and other research funders should support additional research to study the smoke-related human health tradeoffs of different possible forest management strategies in order to improve forest and human health.

FCR #58. Evaluations of the cost/benefits tradeoffs of alternative forest management strategies should include separate analyses for the potential human health tradeoffs and for the potential climate tradeoffs of wildland fire smoke.

FCR #61. California, the federal government, and other research funders should support additional research to evaluate the human health tradeoffs of management strategies to improve the health of non-forested, fire-dependent ecosystems including chaparral shrublands and grasslands.