

Health impacts of wildfires: Improving science and informing timely, effective emergency response

Three of the worst wildfire seasons on record in BC occurred over the past decade, with tens of thousands of people evacuated from communities at risk of fire or hazardous levels of smoke.¹ BCCDC Environmental Health Services (EHS) is developing research, surveillance, and guidelines to support a coordinated health response by physicians, public health practitioners, and emergency managers.

Research

There is clear evidence that wildfire smoke causes exacerbations of chronic lung disease,² but it has been challenging to demonstrate effects on cardiovascular outcomes.³ To date we have demonstrated that, at the community level, dispensations of asthma rescue medications (salbutamol) rise rapidly during wildfire smoke events (**Figure 1**). Our evidence (as yet unpublished) shows that increases in dispensations are associated with measured concentrations of fine particulate matter (measurement of ambient fine particulate matter: PM_{2.5}) in fire-affected communities but not in communities where high particulate matter arise from traffic and other sources. We will next evaluate associations between multiple respiratory and cardiovascular outcomes and several measures of smokiness. We are also participating in an international study on ambulance calls for out-of-hospital cardiac arrest in relation to exposure to wildfire smoke.

This article is the opinion of the BC Centre for Disease Control and has not been peer reviewed by the BCMJ Editorial Board.

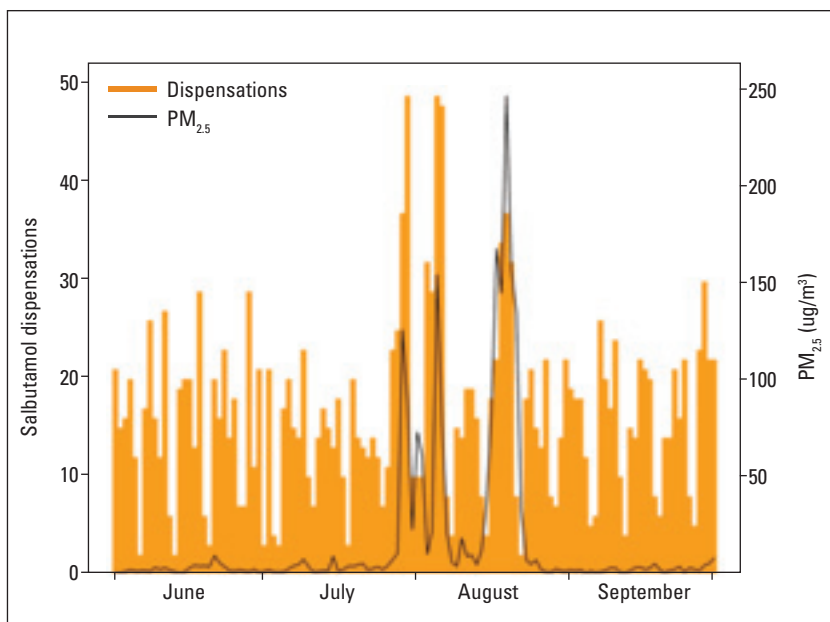


Figure 1. Daily salbutamol dispensations in the Cariboo-Chilcotin local health area and PM_{2.5} concentrations in Williams Lake during the 2010 wildfire season.

Surveillance

BC medical health officers have historically relied upon ad hoc surveys of physicians and pharmacists to gauge health impacts during wildfire smoke events. In response to a need for more rigorous and timely information, we have developed a near real-time surveillance system that tracks salbutamol dispensations and PM_{2.5} throughout the fire season. In 2012, this system detected elevations in salbutamol dispensations associated with smoke from fires in Siberia, the United States, and BC (**Figure 2**). Over the next 3 years we will improve the surveillance system by expanding data streams, developing better health indicators, and incorporating estimates from the BlueSky smoke forecasting system (www.bcairquality.ca/bluesky) so that the surveillance system helps to pre-

dict the health impacts of smoke episodes 24 to 48 hours before they occur.

Guidelines

Physicians care for patients during smoky episodes. Public health practitioners protect populations. Both must decide which interventions to use and when to use them. We have developed a response pyramid for public health practitioners and identified key questions about interventions to mitigate wildfire smoke health effects. However, the current evidence for the effectiveness of interventions is limited. For example, a single observational study⁴ supports the use of portable high-efficiency particulate air (HEPA) filters indoors to reduce symptoms among patients with chronic respiratory disease during wildfire events. Combined with studies of HEPA fil-

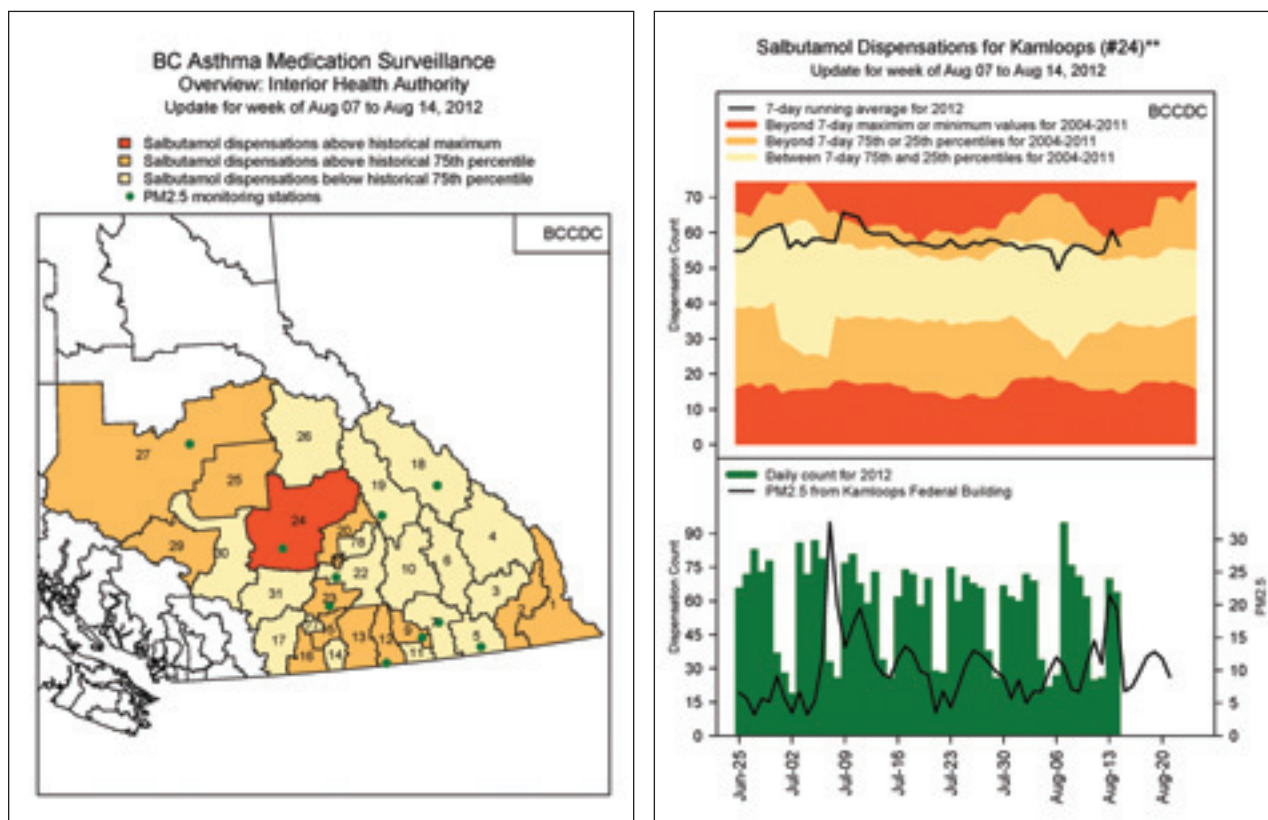


Figure 2. Example of pages from a surveillance report.

The page on the left indicates local health areas within the Interior Health Authority with elevated dispensation counts. Dispensations were above the maximum in the Kamloops local health area. The page on the right shows individual plots for the Kamloops local health area. The elevated $PM_{2.5}$ concentrations in early July were associated with smoke from Siberian wildfires, and the elevations in mid-August were associated with smoke from wildfires in the western United States.

tration for other air pollutants, a case can be made that such individuals would benefit from HEPA filtration during wildfire smoke events. We are reviewing the evidence and convening an international expert panel to develop guidelines for health response to wildfire smoke.

Conclusion

Across North America, wildfires are expected to increase in frequency and intensity as the global climate changes,⁵ and BC forests are particularly susceptible due to the widespread mountain pine beetle infestation. Our goal is to develop research, surveillance, and guidelines to inform a coordinated health response and better protect the health of British Columbians.

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Acknowledgments

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