

RESPIRATORY SYMPTOMS EITHER RESOLVE OR PERSIST 9 YEARS AFTER PM_{2.5} EXPOSURE FROM THE HAZELWOOD COAL MINE FIRE

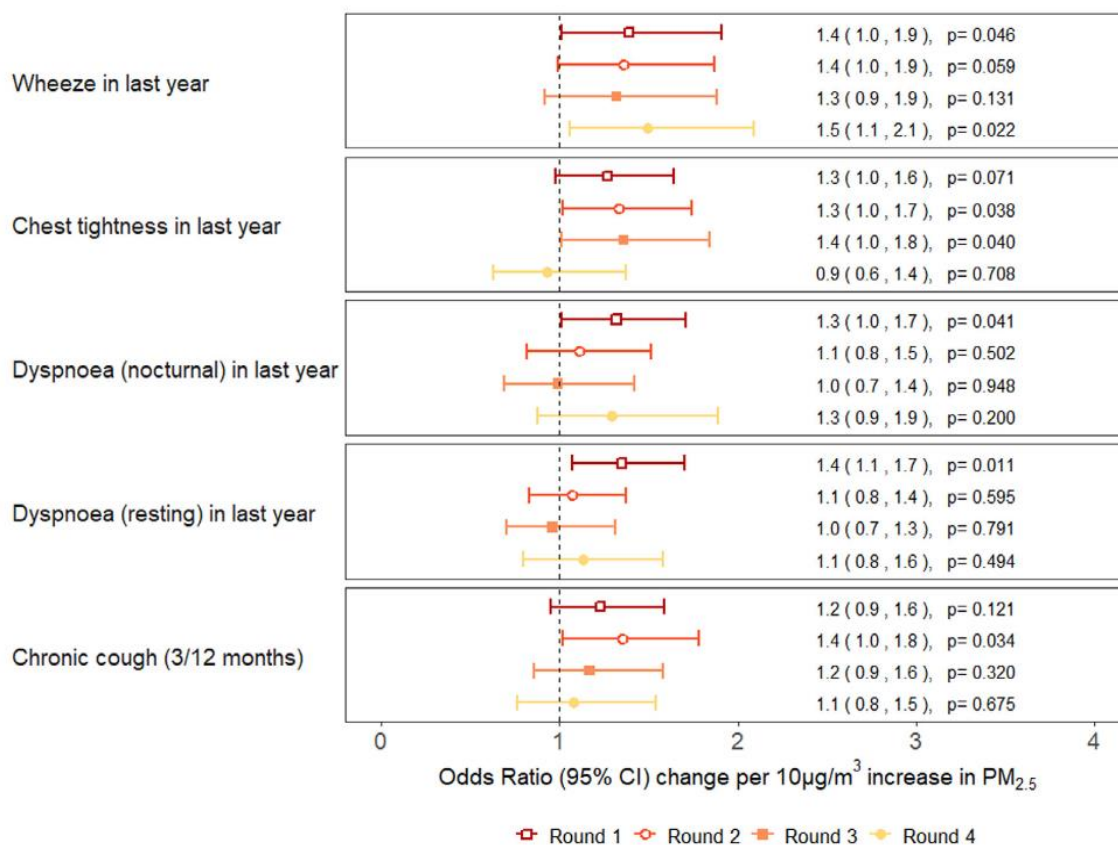
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Introduction/Aim: In 2014, a coal mine fire in regional Victoria, Australia exposed the local community to 6 weeks of large volumes of hazardous smoke containing fine particulate matter <2.5 µm (PM_{2.5}). This study investigated longitudinal associations between PM_{2.5} exposure and respiratory symptoms over a 9-year period post-fire.

Methods: In 2016–17 (R1), adult residents from Morwell (exposed) and Sale (unexposed) completed surveys including validated questions on respiratory symptoms. Individual PM_{2.5} exposure levels were estimated using modelled smoke data and time-location diaries. Respiratory symptoms were followed up in a sample of 519 participants (346 exposed) 4, 7, and 9 years post-mine fire (R2, R3 and R4). Longitudinal associations between PM_{2.5} and respiratory symptoms were assessed using mixed-effects logistic regression, adjusting for confounders (age, gender, socioeconomic status, smoking status, cigarette pack years, occupational exposure, self-reported asthma or chronic pulmonary obstructive disorder diagnosed pre-mine fire).

Figure 1. Associations between PM_{2.5} and respiratory symptoms



Results: 519 participated in R1 and R2, 341 in R3 and 244 in R4. Wheeze was consistently estimated to increase with PM_{2.5} exposure at all survey rounds, significantly so at R1 and R4. The risk of chest tightness associated with PM_{2.5} exposure increased in R2 and R3 before attenuating to null in R4. An increase in dyspnoea (both nocturnal and resting) was associated with increasing PM_{2.5} exposure in R1 only. For chronic cough, an increase in R2, attenuated to null in R3 and R4. No effects were detected on chronic phlegm or nasal symptoms.

Conclusion: While there was some variation over time, these findings suggest that the increases in chest tightness, dyspnoea and chronic cough associated with Hazelwood coal mine fire PM_{2.5} have since resolved. The exception is wheeze with evidence of the effects of PM_{2.5} exposure persist up to nine years later.

Key Words: air pollution, respiratory symptoms, coal mine smoke

Acknowledgments: This abstract presents the views of the authors and not the Department.

Grant Support: Victorian Department of Health.