RESPIRATORY HEALTH EFFECTS OF OCCUPATIONAL EXPOSURE TO BUSHFIRE SMOKE
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D4 Respiratory Health of Fire Fighters
Program D Protection of People and Property

Introduction

➢ Growing concern about the health effects of exposure to bushfire smoke
➢ 8,387 bushfires in WA in 2003-2004
➢ A range of toxic compounds identified, including respiratory irritants such as formaldehyde and acrolein
➢ Limited data:
  • Occupational exposure and related health effects
  • Efficacy of the protective filters on fire fighters’ masks

Objectives

➢ To assess the effectiveness of wearing protective filters under controlled conditions
➢ To validate the findings in the field during prescribed burns and bushfires

Methods

➢ Random allocation to:
  • Particulate filter
  • Particulate/organic vapour filter
  • Particulate/organic vapour/formaldehyde filter
➢ 15 minute controlled bushfire smoke exposure
➢ Measurement of respiratory health outcomes:
  • Respiratory Health Questionnaire
  • FEV₁ and SaO₂ measurements
➢ Air sampling inside the masks

Results

➢ Across the three types of filters, significantly higher number of subjects in both the particulate filter group and particulate/organic vapour filter group reported increased respiratory symptoms ($p < 0.05$)
➢ Significantly higher formaldehyde and acrolein levels were detected inside the masks fitted with particulate filters ($p < 0.05$)

Conclusions

Testing the efficacy of three types of filters under controlled conditions demonstrated that:
➢ The particulate filter is ineffective in filtering out bushfire smoke components, including respiratory irritants such as formaldehyde and acrolein
➢ The particulate/organic vapour/formaldehyde filter provides significantly better protection for fire fighters’ respiratory health compared to both particulate filters and particulate/organic vapour filters