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Fire Fighter Exposure

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Objectives

As a consequence of their employment Fire Fighters are exposed to a range of chemical, physical, biological, ergonomic and psychosocial hazards in response to call outs, including fires, HAZMAT spills and other emergencies. Their health concerns include cancer risk, cardiovascular risk, physical stress, heat stress, psychological stress, and infections. The acute toxic effects from smoke include lacrimation, upper respiratory tract irritation and impairment of lung function. Chronic effects include cardiovascular disease, chronic respiratory disease, and cancer. Current data on Australian firefighters indicates an increased risk of developing certain cancers, as compared to the general population. Prevention of these cancers is dependent on having a better understanding of the range of airborne contaminants that firefighters are exposed to.

Methods

This paper discusses the results, and methodology developed, of a pilot study to identify some of the hazardous materials Fire Fighters are exposed to from constituents of the smoke from a structural fire. The method uses the property of off gassing from the exposed firefighting clothing

Results

The initial results show that firefighters are exposed to the following compounds during the training of fire fighters to extinguish fires.

- Acetaldehyde
- Acrolein
- Formaldehyde
- Ethanol
- Hydrogen Chloride
- Hexane
- Hydrogen Cyanide
- Phosgene
- p-Xylene
- 2,4-Toluene diisocyanate

Conclusions and Recommendations

The initial trials have demonstrated that the firefighting clothing initially absorbs a range of airborne contaminants present during a fire event that can later be analysed to determine as they desorb from the clothing. It is recommended that this study is expanded to include more monitoring of firefighting clothing used in a range of fire scenarios, including bushfires in various parts of Australia to determine the exposures to Fire Fighters.

Keywords: Fire fighting clothing; exposures, health impacts