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Occupational exposures to new dry cleaning solvents: High-flashpoint hydrocarbons and butylal

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Abstract

The dry cleaning industry is moving away from using perchloroethylene. Occupational exposures to two alternative dry cleaning solvents, butylal and high-flashpoint hydrocarbons, have not been well characterized. We evaluated four dry cleaning shops that used these alternative solvents. The shops were staffed by Korean- and Cantonese-speaking owners, and Korean-, Cantonese-, and Spanish-speaking employees. Because most workers had limited English proficiency we used language services in our evaluations. In two shops we collected personal and area air samples for butylal. We also collected air samples for formaldehyde and butanol, potential hydrolysis products of butylal. Because there are no occupational exposure limits for butylal, we assessed employee health risks using control banding tools. In the remaining two shops we collected personal and area air samples for high-flashpoint hydrocarbon solvents. In all shops the highest personal airborne exposures occurred when workers loaded and unloaded the dry cleaning machines and pressed dry cleaned fabrics. The air concentrations of formaldehyde and butanol in the butylal shops were well below occupational exposure limits. Likewise, the air concentrations of high-flashpoint hydrocarbons were also well below occupational exposure limits. However, we saw potential skin exposures to these chemicals. We provided recommendations on appropriate work practices and the selection and use of personal protective equipment. These recommendations were consistent with those derived using control banding tools for butylal. However, there is insufficient toxicological and health information to determine the safety of butylal in occupational settings. Independent evaluation of the toxicological properties of these alternative dry cleaning solvents, especially butylal, is urgently needed.

Keywords: Alternative dry cleaning solvents; butanol; butylal; dibutoxymethane; dry cleaning; formaldehyde; high-flashpoint hydrocarbon; hydrocarbons.

Figures



Figure 1 5 Employee pressing shirts by using...



Figure 2 5 An owner/operator removing still bottoms...



Figure 3 5 Employee spraying shirts with a...

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