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Solvent Exposure Characterisation in the Collision Repair Industry in New Zealand.

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ABSTRACT

Background: Reviews of solvent exposure and neurotoxicity have identified the need for improved understanding of the characteristics of exposure in industries where workers are exposed to solvents (WHO 1985, Baker 1988, Mikkelsen 1996, Meyer-Baron 2008).

Subjects and Methods: This exposure assessment study was conducted in 16 collision repair workshops in the Wellington region of New Zealand, and included 100 air samples from 77 workers in 16 workshops and 76 urine samples from 18 workers. Air was analysed using gas chromatography for solvents and urine was analysed for hippuric acid, metabolite of toluene. Regression analyses were performed and an exposure model was defined.

Results: The highly statistically significant multivariate exposure model with an R square value of .77 was able to explain almost 80% of the variance in the personal air exposure data. Significant associations between personal air solvent exposure and workshop ventilation characteristics were found: Gunwasher if placed in the workshop area without separate ventilation had a coefficient of 2.19 (1.34-3.59) and mixing room ventilation if floor level and away from the main mixing bench had a coefficient of 3.06 (1.51-6.19) compared with the reference category. Urine analysis did not show a statistically significant association with personal toluene or glove use.

Conclusions: Workshop ventilation characteristics have a significant impact on individual exposures. Recommendations can be given to industry to help lower exposures and results can feed into the neurobehavioural study to aid exposure characterisation in this population. This study has shown that exposure characterisation using statistical methods is a plausible and useful way to assess relative weight across a spectrum of exposure sources, and to identify areas for effective intervention.

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