ABSTRACT

During October 1996 to December 1999, isocyanates were the most frequently reported causative agent for occupational asthma cases (16.7% of all cases) submitted to the Surveillance of Work-Related and Occupational Respiratory Diseases in South Africa registry (SORDSA). Occupational disease surveillance registries in other countries also identified isocyanates as the most important occupational sensitiser. Asthma caused by isocyanates exposure may be severe and may persist even after exposure ceases. For this reason, it is important to identify the potentially hazardous isocyanate exposure settings, and to prevent sensitisation and asthma development where possible.

Auto body repair shops, typically small, medium or micro enterprises (SMMEs), were the focus group in this study. Due to the paucity of medical surveillance and occupational hygiene programmes, there is likely to be over-exposure to isocyanates in such workplaces. The aim of this study was to identify and quantify exposure to HDI in auto body repair shops, and secondly, to describe the control measures currently used in these repair shops.

The study investigated hexamethylene diisocyanate (HDI) exposure in the spray-painting processes of automotive repair shops in Gauteng. The repair shops were selected from the Highveld South African Motor Body Repairers' Association (SAMBRA) membership list. Ten repair shops were included in this cross sectional study. Twelve subjects directly or indirectly involved in spray-painting in each repair shop had HDI exposure measured, resulting in a total of 113 HDI measurements. HDI monomers, prepolymers

and total isocyanates determined using the National Institute for Occupational Safety and Health (NIOSH) draft method 5525 for analysis of monomeric and TRIG aliphatic isocyanates.

Eighty one percent of workers were over-exposed to HDI monomers (exposure limit of 0.02mg/m^3) and 3.4% to HDI prepolymers (exposure limit of 0.5mg/m^3). Ninety percent of the establishments' HDI monomer airborne concentration exceeded the OEL and 30% the prepolymer HDI concentrations.

Workers were divided into 12 occupation categories according to the extent of their direct contact with the HDI-based paint and the three highest exposed groups were panel beaters, spray painters and dent-fillers. Workers directly and indirectly in contact with paint, in the auto body repair shops registered with SAMBRA were exposed to high levels of HDI during the spray painting operation. Insufficient and incorrect control measures were in place to control HDI exposure. The findings of this study confirm the risk of exposure to HDI in the automotive repair industry and the need for occupational hygiene control measures.

In conclusion, high concentrations of HDI were common and even indirectly exposed workers were at risk of excessive exposure to HDI. Inadequate exposure control methods were widespread.

Keywords: *Hexamethylene Diisocyanate HDI, Spray painting, Auto body Repair shops*