P97 ESTIMATION OF PARTICULATE MASS AND MN EXPOSURE LEVELS AMONG WELDERS

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Objectives Historical exposure estimates for welding-exposed workers are needed for studies evaluating the relationship between welding and neurologic or other health outcomes. The objective of this study was to develop and validate a multivariate model to estimate quantitative levels of welding fume exposures based on welding particulate mass (PM) and manganese (Mn) concentrations reported in the published literature.
Methods Articles that describe field-based welding PM and/or Mn exposures were identified through a comprehensive literature search. Summary measures of exposure and related determinants including year of sampling, welding process, ventilation, degree of enclosure, base metal, and location of sampling filter were extracted from each article. The natural log of the arithmetic mean exposure level was regressed on these determinants. Cross-validation was performed to aid in model selection and to evaluate generalisability.

Results Thirty-three particulate and 27 Mn means from 28 publications were included. The final model explained 76% of the variability in mean exposures and included welding process and degree of enclosure as predictors. There was little change in the explained variability and root mean squared error between the final model and its cross- validation model, indicating the final model is robust and estimated exposures are consistent with expectations.

Conclusions The relatively large amount of variance explained along with the positive generalisability results increases the confidence that the estimates derived from this model can be used for estimating welder exposures in absence of individual measurement data. Comparison of predicted levels to an independent set of welding exposures further validated the results.