

P80

STATISTICAL MODELING OF CRYSTALLINE SILICA EXPOSURE IN THE CONSTRUCTION INDUSTRY USING A DATABASE COMPILED FROM THE LITERATURE

Jean-François Sauvé,¹ Charles Beaudry,¹ Denis Bégin,¹ Chantal Dion,² Michel Gérin,¹ Jérôme Lavoué³ ¹University of Montréal, Montréal, Canada; ²Institut de Recherche Robert-Sauvé, Montréal, Canada; ³CRCHUM, Montréal, Canada

10.1136/oemed-2011-100382.294

Objectives A quantitative determinants-of-exposure analysis of quartz levels in the construction industry was performed using a database compiled from an extensive literature review. Statistical models were developed to predict full-shift exposure levels by occupation.

Methods Monte Carlo simulation was used to recreate exposures derived from summarised measurements which were combined with single measurements for analysis. Modeling was performed using TOBIT models within a multimodel inference framework, with year, sampling duration, type of environment, project purpose, worksite type and sampling objective as potential predictors.

Results 1237 quartz measurements were included in the analysis, of which 249 were non-detects and 228 were reported as summary statistics. The model containing all the variables explained 16% of total variability. All variables but

sampling duration and work environment were found to be influential predictors of quartz levels. Use of control methods was associated with a 18% average decrease in exposure levels compared to none, and increased concentrations were found for residential, industrial and renovation projects. Predicted geometric means for year 1999 were the highest for underground workers (0.143 mg/m³) and cement finishers (0.125 mg/m³). Heavy equipment operators and foremen were found to be the least exposed with predicted geometric means of 0.028 and 0.032 mg/m³, respectively. Conclusion: The prediction model can be used to estimate full-shift quartz exposure levels in a variety of work conditions in the construction sector. Future uses of this database will focus on the contribution of specific tasks, tools and materials on the quartz concentrations.