Oral presentation

Results We found 8 and 897 Cpg sites differentially methylated in former and current smokers, while compared to never smokers, respectively. The 8 candidate markers of former smoking showed a gradual reversion of their methylation levels from those typical of current smokers to those of never smokers. Further analyses using cumulative (over varying time windows) smoking intensities, highlighted three classes of biomarkers: short and long term biomarkers (measuring the effect of smoking in the past 10, and in the past 10 to 30 years respectively), and lifelong biomarkers detected more than 30 years after quitting smoking.

Conclusions Genome-wide DNA methylation profiles show promising abilities to detect short-term to lifelong biomarkers of tobacco smoke exposure and, more generally, to potentially identify time-varying biomarkers of exposure.

Objective To apply Marginal Structural Models (MSM) to address healthy workers survivor effect in a cohort study of active workers when time varying variables on health status and exposure are measured.

Method We used Cox MSMs and inverse probability weighting to assess the effect of PM$_{2.5}$ exposure on incident ischaemic heart disease (IHD) in an active cohort of 11 966 US aluminium workers. The outcome was assessed using medical claims data from 1998 to 2012. Quantitative exposure metrics of current exposure to PM$_{2.5}$ were dichotomized using different cutoffs and effects were assessed separately for smelters and fabrication. Risk score based on insurance claims was available as a time varying health status variable.

Results Defining binary PM$_{2.5}$ exposure by the 10th percentile cut-off, health status was affected by past exposure and predicted subsequent exposure in smelters, but not in fabrication. A Traditional cox model was appropriate for fabricators; the hazard ratio was 1.51 (95% CI: 1.12 – 2.06) and was attenuated when considering higher exposure cutoffs. In smelters, Cox MSM Hazard Ratios for IHD comparing the effect of exposure in a population had everyone always been exposed to everyone always unexposed, using the 10th percentile exposure cutoff was 1.83 (95% CI: 1.14 – 2.94). Higher exposure cutoffs also resulted in attenuated effects.

Conclusions Marginal Structural Models can be used in active employment occupational cohorts to address time varying confounding. Results from the current study suggest that occupational exposure to PM$_{2.5}$ in the aluminium industry increases the risk of IHD in both smelters and fabrication.

Objective Exposure to metalworking fluid (MWF) causes respiratory outcomes such as asthma and chronic bronchitis, as well as symptoms including phlegm and wheezing. Chronic obstructive pulmonary disease (COPD) encompasses these outcomes, and so is a potential result of MWF exposure. Recent evidence based on g-estimation suggests that reducing exposure to MWF would substantially decrease years of life lost due to COPD. The objective of this analysis is to examine the exposure-response relationship between direct exposure to MWF and COPD mortality in a large occupational cohort.

Method Hazard ratios were estimated using Cox proportional hazards models for the association between cumulative exposure to the thoracic fraction (PM$_{3.5}$) of straight, synthetic, or soluble MWF and COPD mortality. Subjects directly exposed to each fluid type were compared to those who were never directly exposed (assembly workers).

Results Hazard ratios for exposure quartiles increased in a non-monotonic fashion, with a maximum of 1.6 for straight, 1.4 for soluble, and 1.5 for synthetic, reflecting an increased risk of COPD for exposed subjects. However, none of the HRs were significant at the 95% confidence level. Indirect adjustment for...