Poster Presentation

Exposure Assessment

0309 REAL-TIME FINE AEROSOL EXPOSURES IN TACONITE MINING OPERATIONS

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Recent studies have shown that taconite workers may be at increased risk for mortality from lung cancer, mesothelioma, and cardiovascular diseases (CVD). The relationship between CVD and occupational dust exposures at these mines has not been well-studied. We conducted an air monitoring campaign to characterise fine aerosol concentrations at 91 locations across six taconite mines using direct-reading instruments to obtain measurements of mass concentrations ($PM_{2.5}$ or particles with aerodynamic diameter less than 2.5 µm, and respirable particulate matters or RPM), surface area (SA), particle number (PN), and particle size distributions. We fit a Bayesian model with an AR (1) (autoregressive order 1) correlation structure to estimate exposure while accounting for temporal correlation. The highest estimated geometric means (GMs) were observed in the pelletizing and concentrating departments (pelletizing maintenance, balling drum operator, and concentrator operator) for $PM_{2.5}$ and RPM. SA and PN generally had highest GMs in the pelletizing department that processed powder-like particles into iron pellets. Between-location variability estimates were generally higher than within-location, indicating larger differences in exposure levels at different locations between mines. Ranking between $PM_{2.5}$ and RPM generally agree with each other, whereas SA and PN were more consistent with each other, with some overlap with $PM_{2.5}$ and RPM. Differences in ranking these groups may have potential implication for occupational epidemiological studies that rely on exposure information to detect an exposure-response relationship. Future occupational epidemiological studies investigating fine aerosols exposures and health risk are encouraged to consider multiple metrics to see how they influence health outcomes risk.

Poster Presentation

Policy/Impact

0310 MEDICAL REHABILITATION BEFORE THE OCCURRENCE OF EARLY RETIREMENT IN GERMANY - PREVALENCE AND SOCIODEMOGRAPHIC DETERMINANTS OF NON-UTILISATION.

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Introduction In Germany the statutory pension insurance fund covers the cost of rehabilitation treatment for employees whose working capacity is endangered due to health problems. The underlying principle called "rehabilitation over retirement" is the concept to avoid early retirement due to health problems by rehabilitation.

Purpose To describe the utilisation of medical rehabilitation before the occurrence of early retirement in Germany from 2003 to 2014 and to investigate potential sociodemographic determinants.

Methods Analysis based on 20% random samples of administrative pension records from the Research Data Centre of the German Federal Pension Insurance. We used logistic regression models to investigate the risk for non-utilisation of medical rehabilitation during five years before the occurrence of early retirement. Age, sex, non-German citizenship, marital status, school and vocational education, annual income and diagnoses were considered as potential risk factors. Analyses were run with SAS software for statistical analyses (version 9.4).

Results Among all early-retired patients 47.9% (153.990 out of 321.275) did not utilised medical rehabilitation. Risk factors for non-utilisation were to be unmarried or widowed (vs. married, adjusted OR: 1.27; 95% CI: 1.25–1.29), non-German citizenship (vs. German citizenship, 1.28 [1.25–1.32]), unknown or low educational level (vs. median educational level, 1.51 [1.48–1.54]), as well as low annual income (1 st quartile vs. 4th quartile; 3.90 [3.81–3.99]). Also, risk was higher among men compared to women (1.35; 95% CI: 1.33–1.37).

Conclusions Among all early-retired patients almost 50% obtained no medical rehabilitation. Worst affected were deprived persons.

Poster Presentation

Shift Work

0311 CAN SMOKING RESEARCH FROM THE 1950S INFORM TODAY'S SHIFTWORK RESEARCH? APPROACHES TO ASSESS HYPOTHESISED CIRCADIAN DISRUPTION AT AND OFF WORK

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Background In 1950, landmark epidemiology contributed to identifying smoking as a key carcinogen [Wynder and Graham; Doll and Hill]. In 2007, IARC classified shiftwork involving circadian disruption [CD] as probably carcinogenic; however, epidemiological evidence in regards to the carcinogenicity of shift-work that involves nightwork is conflicting.

Objective To compare smoking research from the 1950's to shiftwork research for exploring the hypothesis that today's shiftwork epidemiology is lacking chronobiological and methodological rigour and to develop metrics to facilitate improvement.

Methods Comparing smoking and chronobiological insights and deriving CD metrics.

Results If doses had been limited to number of cigarettes smoked at work rather than over 24 hours, smoking insights could have been delayed or disallowed. Similarly, restricting exposures to, let alone doses of, CD from work at night may prove insufficient to elucidate effects of cumulative CD. CD doses may be obtained by comparing how activities overlap with individuals' biological nights (BNs: predicted by